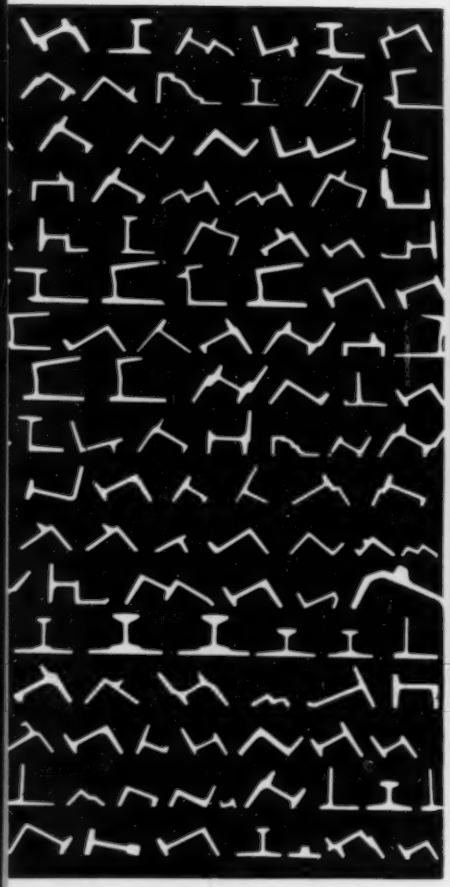
November 1, 1956

The IRON AGE

The National Metalworking Weekly



Special Shapes: Metal Where You Want It P. 91

Aerial Mapping: Industrial Uses Soaring P. 51

Are Steel Price Extras Going Up? P.135

Digest of the Week P – 2

"Trade Names You Can Trust!"

No matter when or where they are purchased, any length of *genuine* Hoskins Chromel-P wire can be used with any length of *genuine* Alumel wire to form a thermocouple which will operate within the close limits specified by Hoskins' Accuracy Guarantee: ±4°F. from 32° to 530°F., and ±¾% from 531° to 2300°F.

HOSKINS Chromel-Alumel

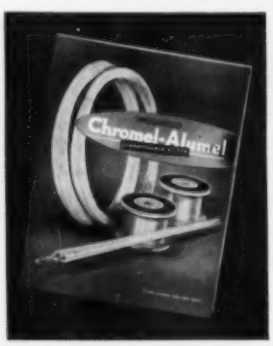
THERMOCOUPLE ALLOYS

CONSIDER for a moment the significance of the statement made above and what it means to users of Hoskins Chromel-Alumel thermocouple alloys the world over. For example, take "The Case of the Ageless Alumel" . . .

Not long ago, an industrial concern in Japan "discovered" 265 pounds of 8-gauge wire hidden away in a remote corner of their plant. Its Inspection Tag, still intact, identified it as being Hoskins Alumel that had been purchased over 20 years ago. How it had escaped being used during all those years no one knew. Inasmuch as it was still in good usable condition, however, the company wrote to inquire if it would be practical . . . or indeed even possible to have a similar quantity of 8-gauge Chromel-P wire specially processed so that its millivoltage would match that of the 1933-vintage Alumel. Imagine their surprise when they were advised that all Chromel-P alloy is specially processed by Hoskins to a uniform standard of quality, and that . . . "regardless of when produced or where purchased, any length of *genuine* Chromel-P wire can be joined to any length of *genuine* Alumel to form a thermocouple which will register true temperature-emf values within the close specified limits of Hoskins Accuracy Guarantee."

No wonder, then, that Chromel-Alumel thermocouples are the world's basic standard of accuracy for the measurement of high temperatures. No wonder that the words "Chromel-Alumel" are recognized as . . . "trade names you can trust!"

If you use thermocouples, this new manual is meant for you! It contains complete specifications on Chromel-Alumel alloys, lists temperature-millivolt equivalents, explains standardization procedures, gives much useful application data. And it's yours for the asking without obligation. Send for your free copy today!



Chromel-Alumel thermocouple alloys are produced exclusively by

HOSKINS MANUFACTURING COMPANY

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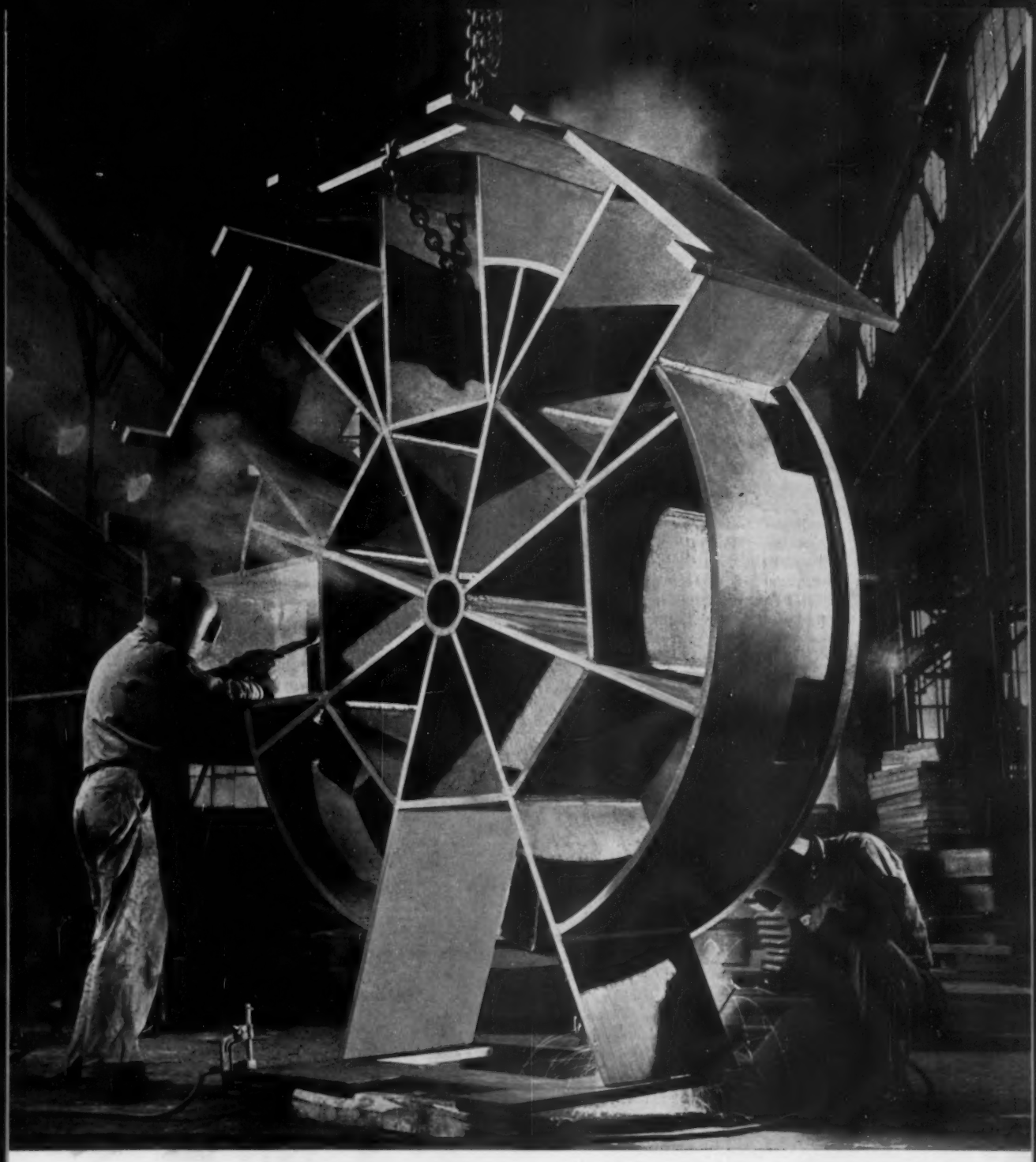

WELDING STEEL PLATE FOR INDEXING MACHINE BASE – When completed, this special machine base will have a diameter of a little over 10 ft, and will weigh nearly 10 tons. The fabrication is being done in the shop of the McGregor Michigan Corporation, of Detroit. Bethlehem plates were used in 1 in., 1¼ in. and 2 in. thicknesses. The uniform quality of Bethlehem plates makes them ideally suited for fabricating weldments. The use of Bethlehem plates, together with good welding technique, is assurance of sound welds. Bethlehem plates are available in a full range of sheared and universal mill sizes.

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BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

Nov. 1, 1956—Vol. 178, No. 18

The IRON AGE

Digest of the Week in Metalworking

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NEWS DEVELOPMENTS

AERIAL SURVEYING HAS GROWING INDUSTRY USES P. 51

Steel mills and other industries with huge outdoor stockpiles find aerial surveying inexpensive and quick. Industrial air pictures also aid in planning plant sites, estimating amount of earth to be excavated for big projects.

APPLIANCES STAGE LAST QUARTER RALLY P. 54

After disappointing middle of the year sales, appliances are staging a

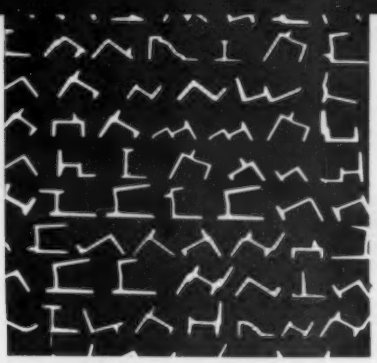
comeback that may set an all time sales record for major items. Home freezers and refrigerators defy rules by picking up in fall. (Norge photo.)

DIEMAKERS SEE NO SALES PEAK YET P. 55

Tool and Die Manufacturers Assn. is sure that 1956 volume of business will be a new industry record. But the diemakers are also sure that the end is not yet in sight.

FLORIDA MAKES A BID FOR MORE INDUSTRY P. 56

Florida Development Commission aims all its big guns at landing more industry for the Sunshine State. Advantages which are making the campaign a success include advantageous location, raw land and water.



THESE ARE JUST a few of the special section profiles that are hot rolled regularly in plain carbon and alloy steels. Used in countless products, they bring impressive savings. You'll learn more in the article beginning on page 91. (Bethlehem Steel Co. photo.)

STANDARDIZATION IS COST CUTTING AID P. 59

Greater use of in-plant standards often has important cash register value. Raytheon saves quarter of a million a year by paring down the number of one group of assemblies stocked. Standardization frequently is seen as having the most benefits for manufacturing, however it can be a valuable sales ally, too.

FEATURE ARTICLES

H-R SPECIAL SECTIONS CARRY BUILT-IN SAVINGS P. 91

Steel bars, hot rolled to special cross-sectional profiles, offer product manufacturers many potential benefits. Major ones include less machining, freight savings, excellent strength and surface finish. Judged by overall production economy, they're often less expensive that standard bar stock, forgings or castings. In some cases, rolled shapes provide the only answers to tricky fabrication problems.

ETCH PENETRANT PINPOINTS CASTING DEFECTS P. 96

In magnesium castings everyday gross defects are those largely responsible for service failures. Defects of this nature are usually surface. So Sikorsky Aircraft developed an improved inspection with etch penetrant technique. Part of a 100 pct inspection on critical parts, the ten-minute method is applied at foundry level.

MAGNESIUM ALLOY MOVES TEMPERATURE BARRIER UP P. 98

A thorium-bearing magnesium alloy—in contrast to magnesium alloys which, not so long ago, had top service temperatures of only a few hundred degrees — exhibits acceptable tensile properties up to 600° F in extended service, 800° F in short exposures. New alloy can be readily stamped, drawn and welded.

CONVERT STANDARD TOOLS FOR LOW COST GUNDRILLING P. 102

Gundrilling can answer your precision hole drilling needs. Frequently, standard shop machine tools can be converted without investing in costly equipment of special design. Milling, boring, screw machines, planers and lathes may be converted at low cost to meet the rigidity, speed, feed and alignment requirements.

HANDLE CHIPS BETTER FOR GREATER SHOP PROFITS P. 104

Handling metal chips and turnings efficiently involves both headwork and hardware. Solution is to know your problem, then select the best equipment and method for handling it. The practical methods shops have found for handling problems of chip disposal are given in this way-and-means article, first of a five-part series.

MARKETS AND PRICES

ENAMELING INDUSTRY FINDS NEW MARKETS P. 60

You may have noticed that more new buildings are going up with porcelain enameled curtain-wall exteriors. It is becoming a popular medium among architects and represents the vitreous enameling industry's big new market, designed to offset losses in kitchenware shipments.

NEW MODEL BUGS BITE AUTO SUPPLIERS P. 68

Steel and other basic materials orders are off in Detroit due to production problems. Auto output 20 pct behind schedule in October but industry hopes to make it up. Feeling of optimism prevails. Total production for November has tentatively been set at about 650,000 units.

IS ANOTHER ROUND OF INFLATION AHEAD? P. 73

Effects of steel, aluminum price increases are just being felt in industry. Recent pay increase to coal miners adds to manufacturing costs. Decision on tax amortization is delayed probably until after first of the year.

BUILDING RATE ADDS TO LURE OF THE WEST P. 75

During first six months California area had three new or expanding plants a day. In Northern area metals and machinery spent $41 million for improvement. L. A.'s gains were impressive, too.

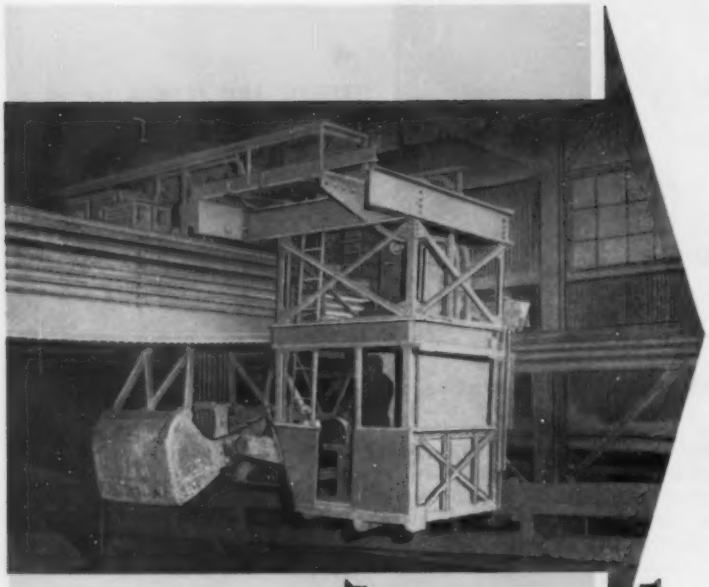
ARE STEEL PRICE EXTRAS GOING UP? P. 135

Rising costs are pinching steel profit margin. Base price boosts after steel labor settlement helped, but some steel men are wondering whether they were big enough. Steel extra increases might be in order.

NEXT WEEK:

HOW TO BE SUCCESSFUL AND HEALTHY TOO

Dr. Harry J. Johnson has been counseling top executives for years on problems of health. In a special article for Iron Age, he comes up with some common-sense pointers on how to keep healthy in the face of pres-present-day business pressures.



CHANGE-OVER TO

EC&M

DYNAMIC BRAKING CONTROL

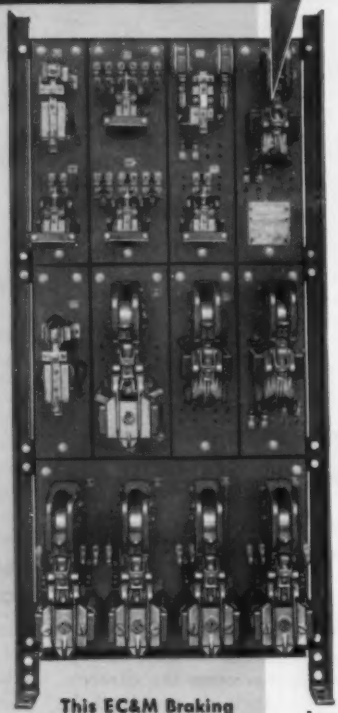
RESULTS IN

Safer, Smoother Operation

OF BUCKET CRANES

Dynamic Braking Bridge-Stop Control

provides an all-electric braking system in which *the driving motor also acts as the braking motor.* Operator applies normal stopping by means of a 2-position foot switch which gives two points of dynamic braking depending upon the speed of the crane and the accuracy of stopping desired. Should power fail, dynamic braking is automatically applied to bring the crane to rest quickly, regardless of the position of the master switch.



This EC&M Braking Panel replaces all mechanical braking devices in southern fertilizer plant and operates satisfactorily in severe acid atmosphere

Something had to be done!

One of the cranes in this plant had partially jumped the runway when power failed at the instant of plugging. Ordinary braking methods failed. Magnetically-released, mechanically-set brake wore down rapidly under hard service. Motor burnouts, shaft and gear failures spelled costly delays. Repairs were a nightmare.

So a change-over was made to all-electric braking. Costly production delays were eliminated. Maintenance became merely routine inspection of motors and controllers. Operation became 100% satisfactory. And the operators warmed up to the smoother stopping.

Dynamic Braking Bridge-Stop Control offers advantages for your cranes. Write us for a copy of Bulletin 921-6.0. It tells how and why.

SQUARE D COMPANY

EC&M DIVISION • CLEVELAND 28, OHIO

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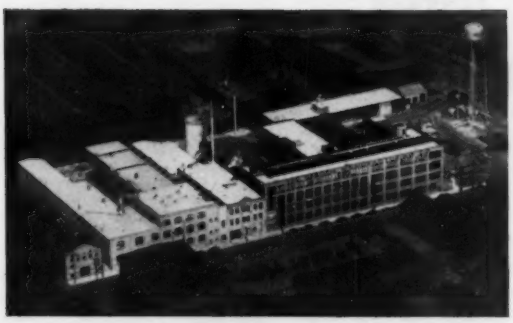
look to OSBORN for improved methods, advanced machinery



Osborn's complete and modern facilities—in engineering, manufacture and application—are available to help you achieve quality mold production at lower cost.

TODAY'S foundrymen, concerned with greater economy and efficiency in both short-run and mass-production molding, turn to Osborn for the latest and most advanced molding machines and methods.

Their confidence comes from the knowledge that Osborn has, for over half a century, pioneered in the development of molding machines manually and automatically operated . . . today continues to lead the field in the development and application of fully automated foundry production machinery.

Whether you're looking for greater economies by replacing individual pieces of equipment or automating a complete molding line, you can depend on Osborn for every assistance. Write The Osborn Manufacturing Company, 5401 Hamilton Avenue, Cleveland 14, Ohio.

OSBORN *Leaders in automation for the foundry*

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES • BRUSHING MACHINES FOUNDRY MOLDING MACHINES

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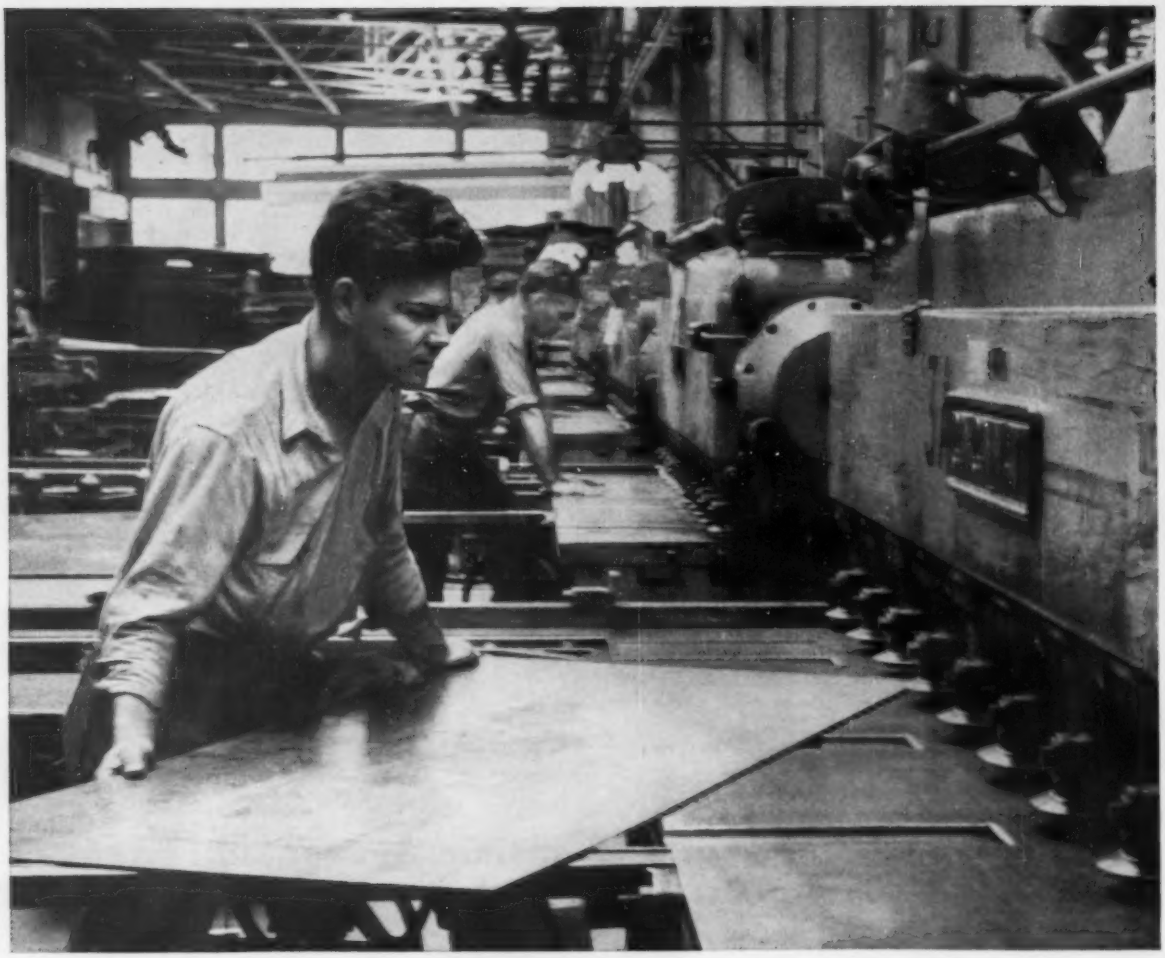

3 kinds of help on sheet and strip steel

Sheet and strip buyers tell us that three kinds of purchasing help keep them coming back to Ryerson:

1. WIDER SELECTION OF TYPES—More than 20 kinds of sheet and coil stock are on hand in an unusually wide range of gauges—making it easier to get the exact steel needed for any requirement.

2. GREATER PROCESSING CAPACITY—The most extensive cutting and processing facilities in the steel-service industry enable buyers to get quickest service on requirements for special sizes, strip and sketch cutting, blanks, slit coils, edging, or any other processing.

3. HELP ON SHEET AND STRIP PROBLEMS—The large Ryerson staff of sheet and strip specialists gives buyers a valuable source of help in selecting the most satisfactory and economical stock—or in solving any other problem of application and fabrication.

In addition, sheet and strip buyers like the good packaging, the dependable weight and on-schedule delivery that they get from Ryerson—and the convenience of one-order buying of all steel products from the same source. So call your nearby Ryerson plant for 3-way help on sheet and strip needs.

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BPA NBP

EDITORIAL

Who Will Help the FRB Decide?

• PEOPLE in government, in board rooms and in the press continue the tight-credit argument. All business is worried about credit. While this goes on the man-in-the-street keeps right on spending.

Higher interest rates imposed by the Federal Reserve Board have not hampered expansion programs—yet. Whether this will be the case next Spring is another question; one that Reserve Board Chairman Martin probably would like answered.

The classical reason for the higher rates and tighter credit availability is to keep us from going on a wild inflationary spree. Most bankers and economists believe the Board is doing the right thing.

The big question is whether or not it will have sufficient judgment to let up on the credit squeeze at the right time. The Board's statistical artists must often wait 30 to 60 days to get statistics for decision making.

Higher interest rates have done little except add to the cost of expansion, credit and products. Stringent control of credit has done little except worry those who have embarked upon legitimate expansion programs.

The going could become rough for some small and large businesses if the credit picture stays as tight as it is now. What the insiders of finance don't say is that there is no such thing as suspended stabilization. Things go up or they go down: as long as the momentum is not out of control, all is well.

The FRB is trying to tell business that it should borrow long term for long-term expansion benefits; it arbitrarily says that short-term money should not be for expansion.

But many firms must have short-term money in order to modernize their plants and thus encourage long-term equity financing. So far they are getting what they think they need.

What seems clear is this: the FRB is composed of humans capable of making mistakes in judgment. We are in a world sea of inflation. All efforts to stem that tide are worthwhile.

But if the Board finds its medicine doesn't work, it should change it before the patient developes a new illness.

Tom Campbell

EDITOR-IN-CHIEF

"They should make these things of Stainless"

As any motorist knows, exhaust systems on automobiles seem to be the "Achilles Heel" in an otherwise miracle of craftsmanship.

Like the mechanic says, "They should make mufflers and exhaust pipes from Stainless Steel—then they would have something!" And, we might add, something for which the average motorist would gladly pay an extra premium.

High heats for long periods has little deteriorating effect on stainless, and its resistance to the corrosive elements that are a major cause of present day exhaust system failure has long been established.

It seems certain that one day most exhaust systems will be fabricated of stainless steel—and when they are, a good part of the stainless will be from the mills of Sharon—pioneer and prime producer of Stainless Steel for the automotive industry.

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SHARON, PENNSYLVANIA

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9360

dear editor: *letters from readers*

Birth of the Army-Navy E

Dear Sir:

I am enclosing a clipping from the Sept. 27 IRON AGE (see cut) of which recalls an interesting experience I had in the spring of 1941. At that time, the Navy was embarking on a big program of expansion . . . I was in Cincinnati, when I received a call asking if I would go to Washington to see if I could help them out on a problem they were facing . . .

I was shown a nice steel double desk which was to be mine on one side and my secretary's on the other. Unfortunately, they had not yet received any chairs to go with the desk. I told them I needed no secretary. I noticed a nice long drawing board against the wall and a couple of stools, and I asked if I could appropriate them. It was a go, and I was in business.

There were some weird happenings which have often made me wonder how we ever eventually won the following war. Suffice it that I finished the job a couple of days ahead of the contract date, got them to deduct the two days from the contract price and turn me loose. It seems that they called the report charts which were established for use in all the shipbuilding establishments in the country, the "Patch Charts."

I returned to Cincinnati and was just signing in at the Cincinnati Club when the telephone was placed in my hands. It was Captain Jones of the Bureau of Ships asking if I would come back to Washington and run a shipyard contest. I told the Captain I thought such a contest was foolish. He said, "Never mind if you do, Secretary Knox and President Roosevelt are pleased with your charts and want to have a contest."

I suggested that any yard which kept consistently abreast of its schedule be allowed to fly from its plant flagstaff, a flag similar to the blue Efficiency Flag awarded each year to the ship which made the best score during fleet maneuvers.

RESERVE PENNANT, successor to the Army-Navy "E"

I'll be blest if the next thing I knew they weren't awarding E flags over the country and when the Army too wanted to benefit by the idea, the red and blue combination flag was produced to add to the variety of the landscape. *C. E. Patch, Morton C. Tuttle Co., Boston, Mass.*

Water Treatment

Sir:

Would you please send me a reprint (two if you can spare them) of your special report "Is Industry's Water Level Too Low?", which appeared in THE IRON AGE for Aug. 2, 1956? This is a wonderful treatment of the water problem and I should like to have my students read it. Thank you. *C. L. White, Prof. of Geography, Stanford University, Stanford, Calif.*

I'M A TOUGH BUYER

BUT GARRETT'S GOT IT FOR QUALITY

No sir, you *can't beat Garrett* when it comes to top quality in small parts. Their "statistical quality control system" means every shipment you get is the finest. But quality is only part of what I like about Garrett. They manufacture and stock the world's most complete line of washers and hose clamps. Boy, when you need any kind of a lock washer, flat washer, spring washer or hose clamp you get it fast . . . most everything right out of stock.

When it comes to stampings and assemblies that's where their high-speed automatic equipment stars. Turns out exactly what you want in no time at all.

Sure, I'm a tough buyer. I want the best. I want it fast. I want it priced right. And Garrett is the place for me.

LOCK WASHERS
FLAT WASHERS
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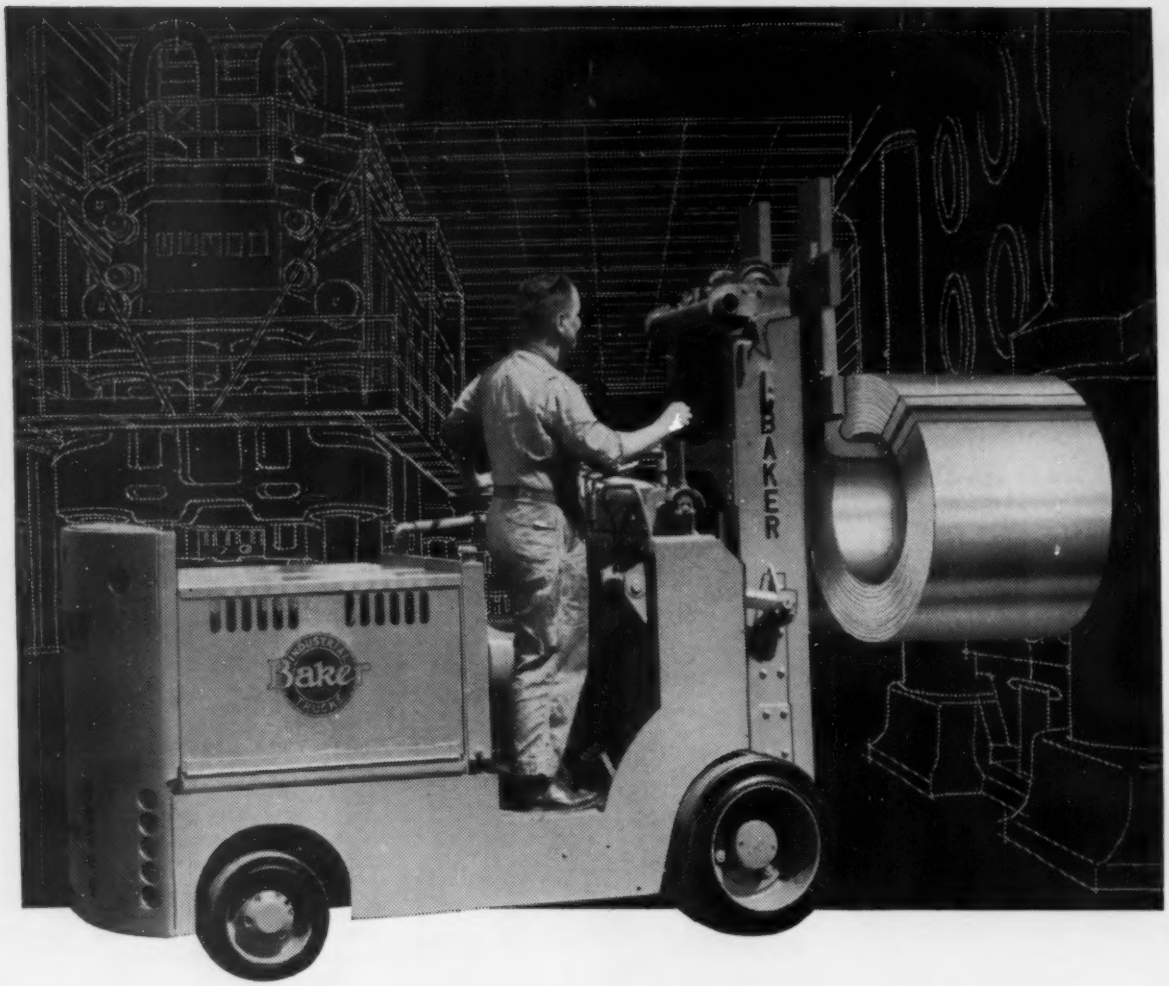

BAKER "JOM"—a BIG truck for efficient handling of BIG loads up to 10,000 pounds

Here is a rugged, heavy-duty fork or ram truck designed specifically for dependable handling of big, heavy loads. Capacities 7000, 8000 and 10,000 pounds.

Travel motor designed and built by Baker for grueling heavy service has high overload capacity. Five forward and reverse speeds. Foolproof electric interlock makes it impossible to start in high . . . assures smooth starts, protects motor, truck, and load. Automatic power shut-off and braking provides added safety when operator leaves his position.

Power steering makes the JOM easy to operate, reduces operator fatigue, means more work. Easily manipulated levers are conveniently located for greatest safety and most efficient operation. Low-cut design of the JOM gives the operator complete all-around vision of the load and road at all times.

Frame is of heavy gauge steel welded into a rigid one-piece assembly. Bumper counterweight is integral part of the frame for extra strength and stability.

Service time and costs are further reduced because all components are easily accessible . . . not hidden or covered by the frame. Write for Bulletin 1328.

Baker®
handling equipment

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1227 WEST 80th STREET • CLEVELAND 2, OHIO

A subsidiary of Otis Elevator Company

6E-5

fatigue cracks

Something Old, Something New

Remember a few months back we carried a picture of a tie designed after the stainless steel panels on New York City's new Socony-Vacuum Building?

Well, the idea seems to be catching on. Latest we've heard about is a drapery fabric based on the historic locomotives in the Baltimore & Ohio RR's Transportation Museum in Baltimore. Idea came from a veteran rail-roader who wrote the B&O asking for pictures of the locomotives. He said his wife wanted to reproduce them on a quilt she was making, if a way could be found of getting the engines on cloth.

From there on out, Virginia Tanner, editor of the B&O magazine, carried the ball; with the result that fabrics gaily decorated with

New Look For Old Locomotives

pictures of the ancient locomotives were put on sale throughout the country's department stores and decorator shops this week.

Speaking of B&O firsts, the road this week employed self-propelled, rail diesel cars to make up a complete train, intended for medium length-runs for the first time in railroading history.

The new all-stainless steel train, built by the Budd Co. will operate in an all-daylight service between Philadelphia, Baltimore, Washington and Pittsburgh over the B&O's main line across the Alleghenies. Called the "Daylight Speedliner" it is said to offer the fastest rail service between the nation's capitol and the Steel City.

Now our problem was whether to show you the new train or the old locomotives. After wrestling with our conscience for a long time (3 sec) we finally picked the one we thought you'd like. Nicely draped, too.

What He Say?

Metalworking, to us, is a colossal, even an awe-inspiring subject. Too bad some of the terms we Americans use for certain of its processes aren't as smashingly descriptive as some of those used in other countries.

The word "quench", for example, does not impress us as we think it should. It's rather weak and its sound suggests a squeezing action rather than a sizzle-pop. The German word for quenched is "abgeschreckt" which, for us, bears the ring of finality.

When we read about an alloy being "abgeschreckt von 1500° in wasser", we feel pretty certain it couldn't have been a slack quench. Sounds altogether too drastic.

Any more metalworking terms strike you this way? We'd like to hear about them.

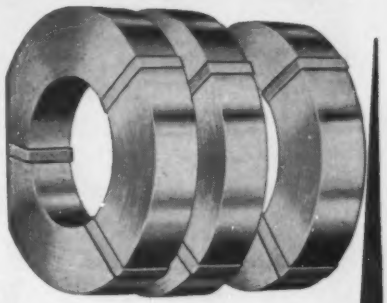
New Puzzler

Chester Stone, American Steel & Wire, sends us this one that faintly rings a bell someplace. It's one of the age problems.

The combined ages of Mr. A and Mr. B is 88 years. Mr. A is twice as old as Mr. B was when Mr. A was half as old as Mr. B will be when Mr. B is three times as old as Mr. A was when Mr. A was three times as old as Mr. B.

How old is Mr. A?

Alloy Strip in Precision Sizes meets New Design Needs...



From 0.0005 in. to 0.040 in. thick and 0.090 to 6 in. wide, these alloys are available as special-tolerance strip:

Beryllium Copper
Phosphor Bronze
Nickel Silver
Brass
Chromium Copper
Stainless 17-7PH
Invar
Magnetic: High Nickel

Some immediately available. Others rolled to order in 2 to 21 days. Can be supplied in coils or straight lengths with slit or filed edges—also cadmium plated.

Write for Bulletin 7 TODAY.

PENN
PRECISION PRODUCTS, INC.
501 Crescent Avenue • Reading, Pa.

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Philadelphia — *J. A. RHODES, Upper Darby, Pa.*
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Los Angeles — *KRUSEN WIRE & STEEL CO.*

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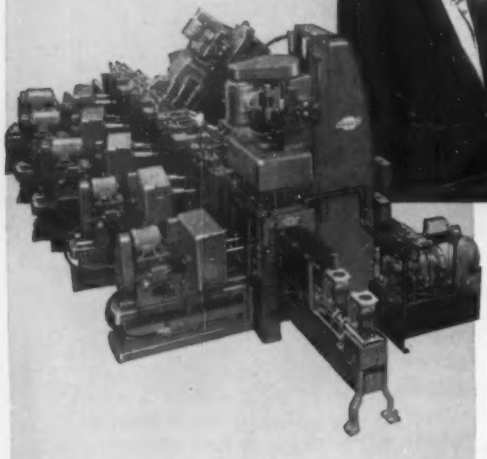
GREENLEE OFFERS

A PROFIT-MAKING INVESTMENT IN HIGH-PRODUCTION MACHINE TOOLS

Greenlee Six-Spindle Automatic Bar Machine.

Greenlee 22-Station Automatic Transfer Machine for machining transmission cases.



Greenlee 10-Station Automatic Transfer Machine.

Greenlee creative thinking, Greenlee engineering and Greenlee experience combined with that of your own engineers will help you "produce more at lower cost."

Ideas, engineering, experience and facilities of Greenlee Bros. & Co. develop improved methods and machines for greater and greater productivity of future models.

Greenlee's adequate facilities expedite the transition from production ideas to production machines . . . a profit-making investment at work in your plant.

GREENLEE STANDARD AND SPECIAL MACHINE TOOLS

- Multiple-Spindle Drilling and Tapping Machines
- Transfer-Type Processing Machines
- Six and Four-Spindle Automatic Bar Machines
- Hydro-Borer Precision Boring Machines

Write for Further Information

GREENLEE

GREENLEE BROS. & CO.
1811 Mason Ave.
Rockford, Illinois

dates to remember

NOVEMBER

Instrument Society of America—Symposium, Nov. 7-8, Bellevue-Stratford Hotel, Philadelphia. Society headquarters, 1319 Allegheny Ave., Pittsburgh.

Porcelain Enamel Institute—18th annual shop practice forum, Nov. 7-9, University of Illinois, Urbana, Ill. Society headquarters, Associations Bldg., 1145 Nineteenth St., N.W., Washington, D. C.

EXPOSITION

Third International Automation Exposition—Nov. 26-30, New York.

Steel Founders' Society of America—Technical and operating conference, Nov. 7-9, Carter Hotel, Cleveland. Society headquarters, 606 Terminal Tower, Cleveland.

Scientific Apparatus Makers Assn.—Laboratory apparatus and optical sections' midyear meeting, Nov. 7-10, The Homestead, Hot Springs, Va. Society headquarters, 20 N. Wacker Dr., Chicago.

Society of Automotive Engineers, Inc.—National fuels and lubricants meeting, Nov. 8-9, The Mayo, Tulsa, Okla. Society headquarters, 29 W. 39th St., New York.

National Electrical Manufacturers Assn.—Annual meeting, Nov. 12-16, Traymore Hotel, Atlantic City, N. J. Society headquarters, 155 E. 44th St., New York.

Investment Casting Institute—Annual meeting, Nov. 13-15, Sheraton-Cadillac Hotel, Detroit. Society headquarters, 27 E. Monroe St., Chicago 3, Ill.

Farm Equipment Institute—Fall Meeting, Nov. 15, La Salle Hotel, Chicago. Society headquarters, 608 S. Dearborn St., Chicago.

National Assn. of Waste Material Dealers, Inc.—Fall meeting, Nov. 15-19, Hollywood Beach Hotel, Hollywood, Fla. Society headquarters, 271 Madison Ave., New York.

The American Society of Mechanical Engineers—Annual meeting, Nov. 25-30, Statler Hotel, New York. Society headquarters, 29 W. 39th St., New York.

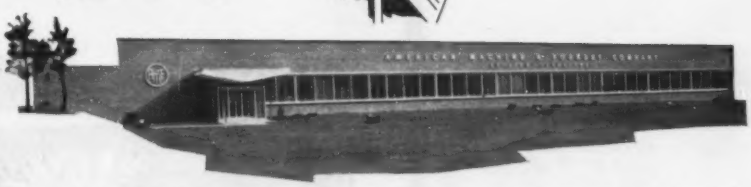
Wire Reinforcement Institute, Inc.—Fall meeting, Nov. 26-27, The Jung Hotel, New Orleans, La. Society headquarters, National Press Bldg., Washington 4, D. C.

Society for the Advancement of Management—Annual operations research conference, Nov. 26-30, Hotel Commodore, New York. Society headquarters, 74 Fifth Ave., New York.

AMF ... RESEARCH

typifies the opportunities for modern science industries in

NORTH CAROLINA



One of the South's most modern industrial research and development facilities . . . with electrical, mechanical and electrochemical sections . . . is operated in North Carolina by American Machine & Foundry Company.

This laboratory has grown rapidly since its establishment in 1951 and now occupies a new building with room for still further expansion.

Product design and development here range from high-speed automatic machinery to high power silver-zinc batteries for guided missiles, some smaller than a cigarette package.

Engineering and scientific skills for modern science industries are expanding in North Carolina.

In the center of the State is the outstanding Research Triangle area of the University of North Carolina, N. C. State College and Duke University.

AMF and other leaders find substantial advantages in this research atmosphere, so accessible to advisory talents, experimental instruments, and graduates who prefer to live and work in North Carolina.

NEW

32-page illustrated editorial survey "NORTH CAROLINA'S SECRET WEAPON". *A wealth of up-to-date industrial information. Sent on request.*

Progressive companies in diverse fields are welcomed by a business-like State government and friendly communities. Interesting and helpful information for expanding companies is contained in a newly published editorial survey of the remarkable industrial growth of North Carolina. Phone, wire or write in confidence for a copy.

William P. Saunders, *Director*
DEPT. of CONSERVATION AND DEVELOPMENT
Raleigh 11, North Carolina

NORTH CAROLINA
YEAR 'ROUND MID-SOUTH

Frogs and Florists

Florists keep flowers in place by sticking the stems into the sharp pins of a florist frog—sharp pins that are often made from hard drawn, low carbon CF&I-Wickwire Pin Wire which is free from scratches and other surface imperfections.

Chances are you don't need wire to make florist frogs. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

Check This List!

FOR THE WIRE YOU REQUIRE, SEE CF&I-WICKWIRE.

FLAT AND SHAPED WIRES
Armor Wire
Bobby Pin Wire
Bookbinder Wire
Brush Wire
Casing Wire
Cotter Pin Wire
Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE
Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

HIGH CARBON FINE AND SPECIALTY WIRE
Aircraft Cord Wire
Armor Wire
Belt Hook Wire
Bobbin Ring Wire
Brush Wire (Tempered and Untempered)
Brush Wire (High Strain)
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
Hose Wire, Mechanical
Hose Wire, Vacuum and Defroster
Rope Wire
Signal Corps Wire
Spoke Wire
Hard Drawn Spring Wire
Oil Tempered Wire
Spheroidized or Annealed Spring Wire
Tire Bead Wire
Valve Spring Wire

MANUFACTURERS LOW CARBON COARSE WIRE
Bag Tie Wire
Basket Handle Wire
Box Binding Wire
Brush Handle Wire
"Cal-Tie" Wire
Can Key Wire
Case Hardened Ball Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire (Coiled)
Lingo Wire
Lintel Wire
Loop Wire
Merchant Quality Wire
Pail Bail Wire
Rivet Wire
Stapling Wire
Strand Wire
Tying Wire
Welding Wire
Wissco Iron Wire
Industrial Quality Wire
Cold Rolling Quality Wire
Heading, Forging or Roll Threading Quality Wire
Medium High Carbon Wire

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

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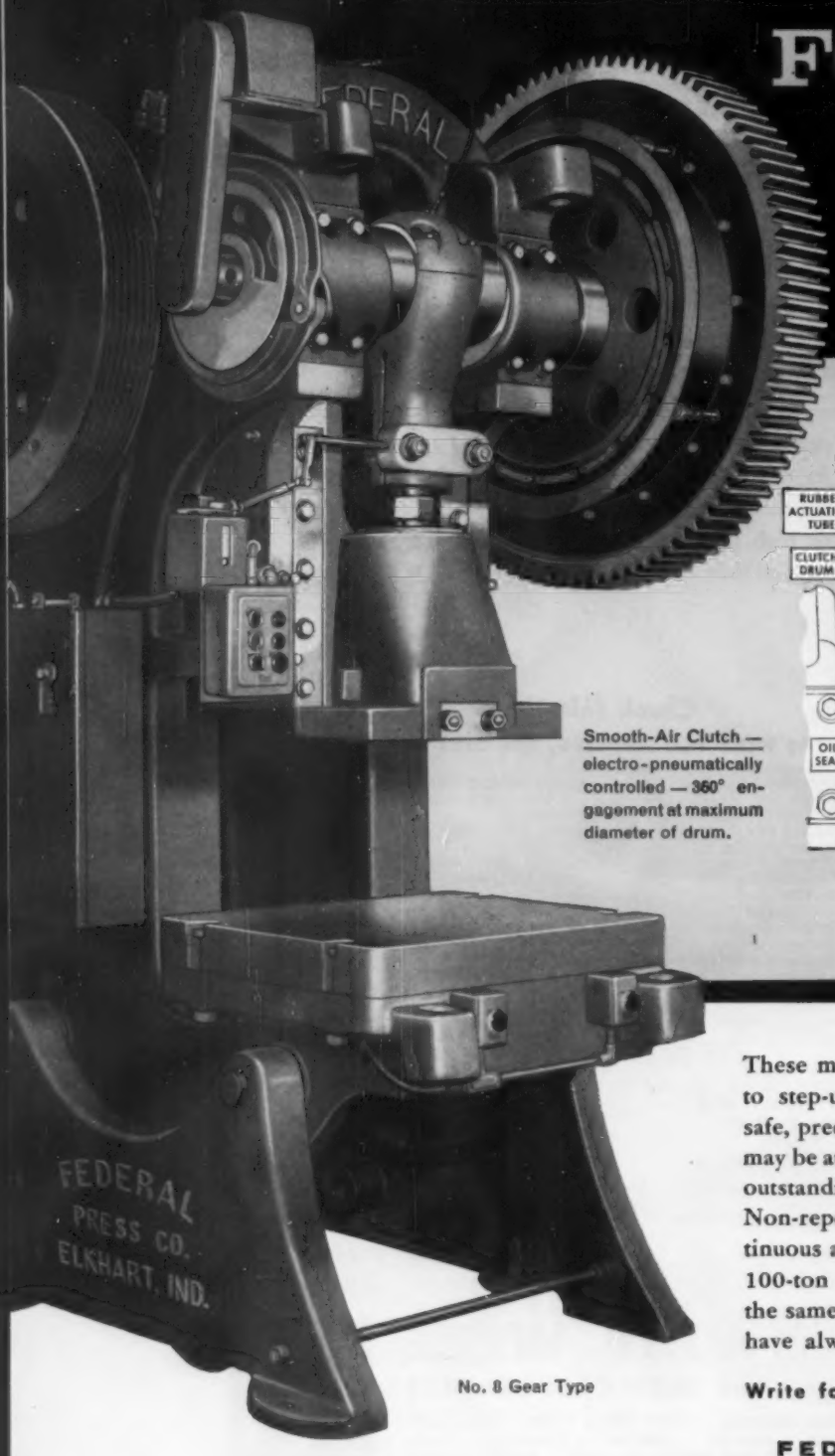
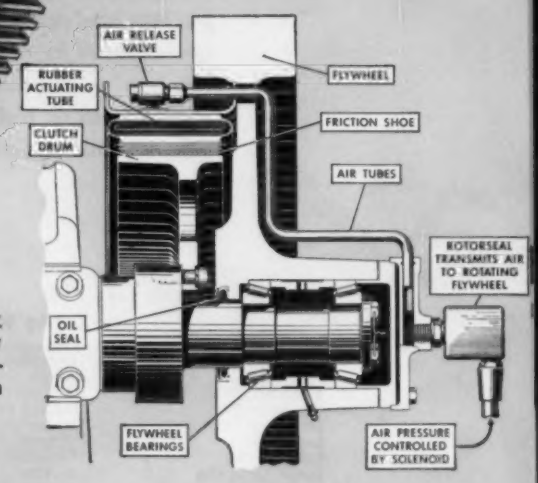
4242

Now you can **PRODUCE FASTER FOR LESS**

with this 100-ton **FEDERAL** air-clutch press





Smooth-Air Clutch — electro-pneumatically controlled — 360° engagement at maximum diameter of drum.

No. 8 Gear Type

These modern Federal Presses have what it takes to step-up production and cut unit costs! Their safe, precision, fatigue-free operation *at high speeds* may be attributed to the fast-acting clutch plus other outstanding features. Dual-solenoid safety valve. Non-repeat mechanism. "Inching" control. Continuous as well as single-cycle operation. In 6.6 to 100-ton capacities, these rugged presses embody the same superior materials and workmanship that have always distinguished Federal's construction.

Write for new catalog showing complete line.

FEDERAL PRESS COMPANY
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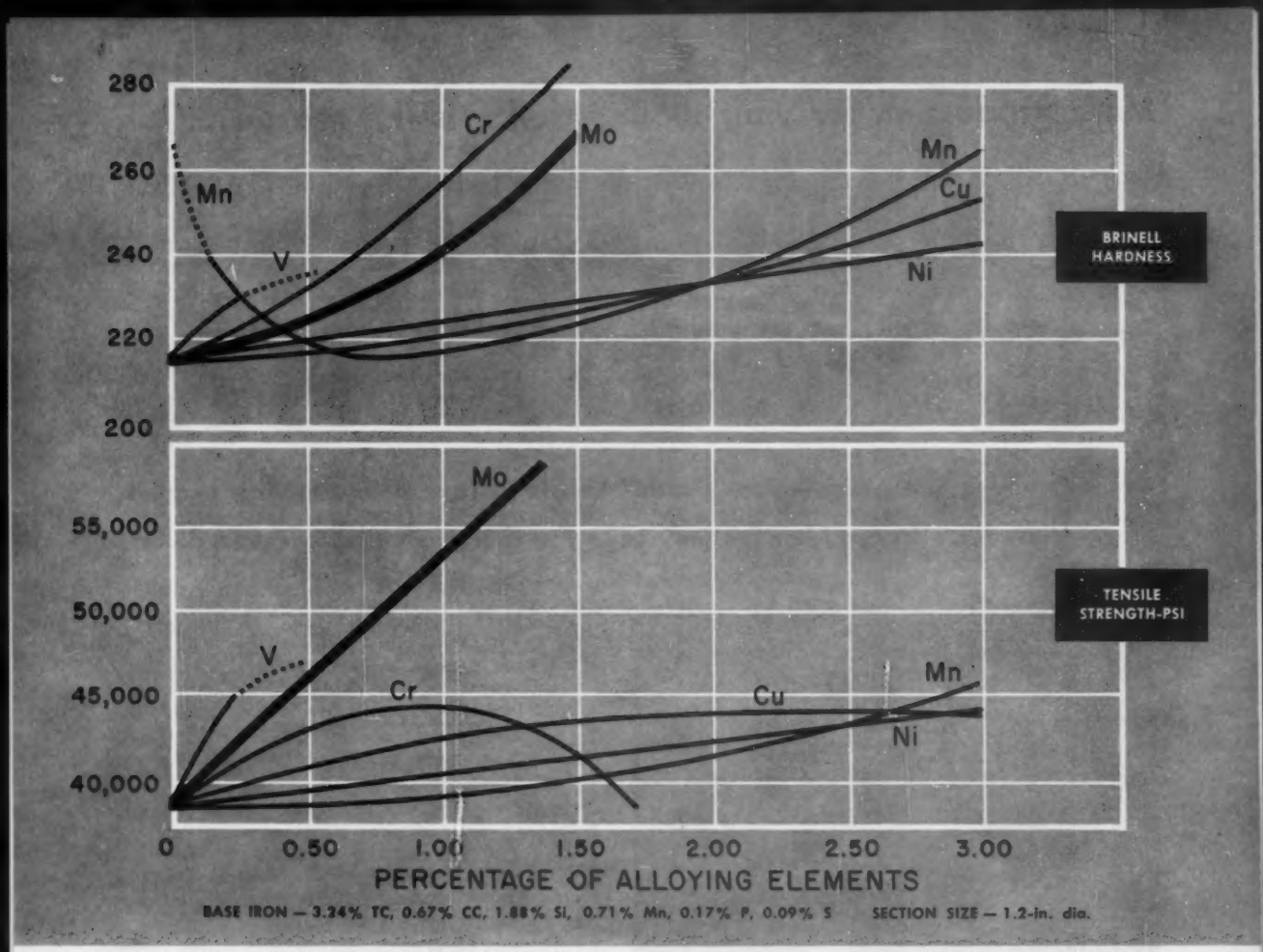
FEDERAL *Open back Inclinable* PRESSES

31 Years of Quality Construction



Note how additions of moly, up to 1.5%, produce proportional improvements in strength. And, with moly, hardness increases much more slowly. It means higher strengths can be used with less danger of impaired machinability.

each ½% Moly adds 7000 psi to strength of cast iron...

A little moly adds a lot of strength — for molybdenum increases strength more than any other common alloying element, with the exception of small vanadium additions. A rule of thumb is that fifty points of moly raise tensile strength 7000 psi. And without sacrificing toughness. Actually, moly improves toughness at least as much as strength.

What's more, versatile moly aids in obtaining uniform response to heat treatment . . . and in producing machinable, growth-resistant castings. Moly is easy to use, too.

With most grades of cast iron, moly requires no change in the character of the charge, normal melting practice, or the base metal. And foundrymen like the fact that the small additions necessary may be made at the spout or in the ladle.

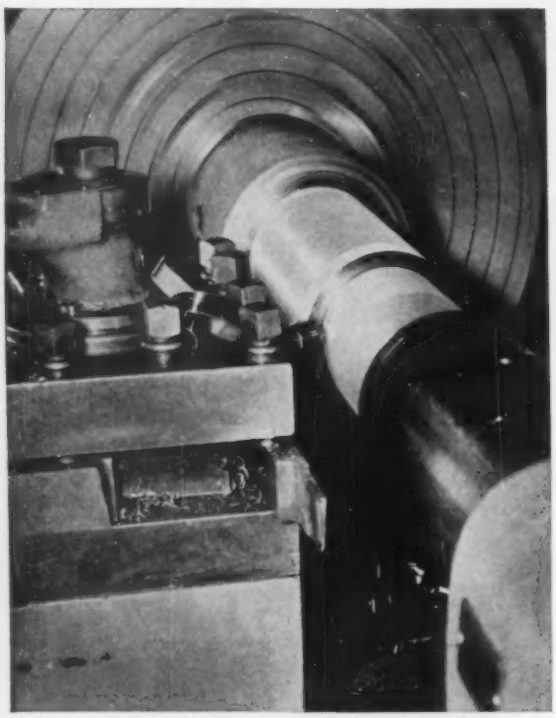
Write now for "Why Moly Iron". It's the full story of how and why moly adds strength faster than hardness, how it increases fatigue and torsional strength—in short why moly makes better cast iron. Climax Molybdenum Co., Dept. 2, 500 Fifth Avenue, New York 36, N. Y.

CLIMAX MOLYBDENUM

More production for your tooling dollar is the reason...

WHY IT PAYS TO SPEND FOR CARBOLOY EXTRA—

If you rely on "Equivalent Grade" Charts to save a few tooling pennies, these facts on carbide costs may save you thousands of production dollars



TESTS ON STAINLESS STEEL VANED ROLLS by a New Hampshire pulp and paper-processing equipment manufacturer demonstrate how the "Equivalent Grade" Charts hide tremendous differences in carbides' production abilities. With Grade "X," production per tool was limited to two pieces per grind. Machine speed had to be held down to protect the carbide.

Switching to Grade 370 brought the manufacturer 8 to 9 pieces per grind. Machine speeds were doubled; 14 hours a day in labor were saved. Result: savings of more than $100 a week, in addition to lower downtime, grinding, and inventory costs.

SO-CALLED "Equivalent Grade" Charts hide the fact that no two carbide grades will produce the same results. Because they classify carbides by broad areas of application, the Charts ignore important differences in production ability.

Thus, they mislead buyers into believing they can safely purchase the cheapest grade listed for a job.

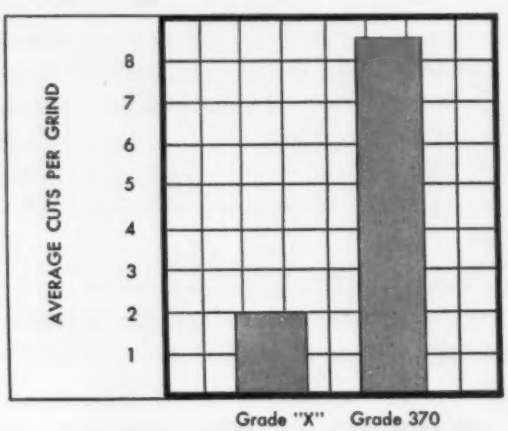
But actual tool-comparison tests have proved conclusively that the production abilities of carbides *do* vary tremendously. Moreover . . . these tests show that the pennies saved by buying on low initial cost often lead to thousands of wasted dollars . . . in lost production, lower machine efficiency, non-productive man-hours.

The case history at left is one of hundreds demonstrating why cost per finished piece — not initial cost — is the only reliable guide to buying carbides.

Results of an actual comparison test

According to the "Equivalent Grade" Charts, any one of several carbide grades could handle the job of machining these rolls. The manufacturer tried Grade "X" first — because it cost 10% less, initially, than Carboloy* Extra-Performance Grade 370.

Grade "X," however, machined only two rolls per day. Grade 370 increased production to 8 or 9 pieces per day (Graph No. 1).

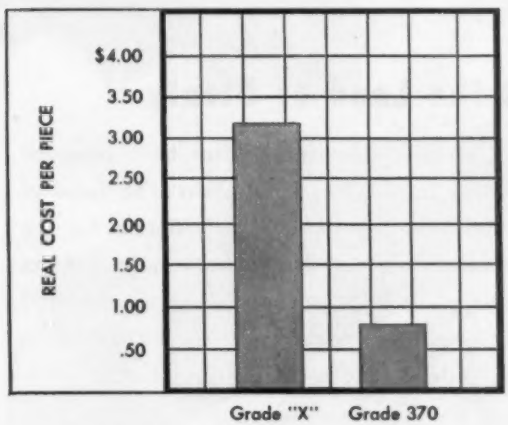


Graph No. 1—Production Ability Comparisons

A FEW CENTS MORE PERFORMANCE CARBIDES

When the *real* cost of the tools was calculated, the manufacturer found the initial saving with Grade "X" was actually *making* him *lose* more than $100 a week. Here's why:

The real cost of Grade "X" was $3.18 per piece machined (2 pieces from a $6.37 tool). The real cost of Grade 370 is just $.82 (average of 8½ pieces from a $7.01 tool). On the weekly production of 42-43 rolls, the saving totals $100.30!



Graph No. 2—Real Cost Comparisons

Yet even this eye-opening figure does not tell the whole story. The Grade 370 tool operated at twice the speed of Grade "X." It helped save the manufacturer 14 hours a day in labor. It provided twice the tool life. It eliminated a special finishing tool.

When these facts were translated into dollars and cents, the manufacturer found that downtime costs were reduced, because the tool remained on the job longer. Grinding costs were reduced, because the tool required less maintenance. Inventory costs were reduced, because a few tools did the work of many.

When added up, these amounted to a considerable saving—yet nothing in the "Equivalent Grade" Charts could have forecast it. These are savings which buying on the basis of initial cost always obscures. These are savings which more than justify spending a few cents more for carbides with extra production ability.

Carboloy Extra-Performance Carbides available for all steel-cutting jobs

Heavy-Duty Grade 370, used in the test above, is one of three Carboloy Extra-Performance Carbides. Together with Medium-Duty Grade 350 and Finishing Grade 330, these grades cover the entire steel-cutting range from roughing to finishing.

Extra-Performance Grades 330, 350, and 370 cost more, initially, because they are made by a unique and more costly process. But their performance so far exceeds conventional carbides that there are actually no "equivalent" grades for any of them. They cannot be fitted into the arbitrarily selected cubbyholes on the "Equivalent Grade" Charts now in common use.

These Extra-Performance Grades easily expose the fallacy of the "Equivalent Grade" Charts, because they are so superior to other steel-cutting grades. But even when attempting to classify conventional grades, the Charts exhibit the same fatal flaw.

Because there is no way of knowing in advance how any grade will perform on the job, we make this suggestion: Always run your own comparison tests *before* you specify a grade. When the results are in, you will find that one grade will bring your plant significant savings in tool costs, machining and labor expense.

We think you will find *that grade* will be one of the Carboloy Extra-Performance Carbides. But whatever it is, specify it *by name*. Do not settle for an "equivalent" grade.

If you would like a more detailed discussion of the whole problem of Initial Costs vs. Real Costs, and the fallacies of the so-called "Equivalent Grade" Charts, write today for a sales engineer to call on you. Send your request to: *Metallurgical Products Department of General Electric Company, 11153 E. 8 Mile Road, Detroit 32, Michigan.*

CARBOLOY

CEMENTED CARBIDES

*CARBOLOY IS A TRADEMARK OF GENERAL ELECTRIC COMPANY

to feed the hungry

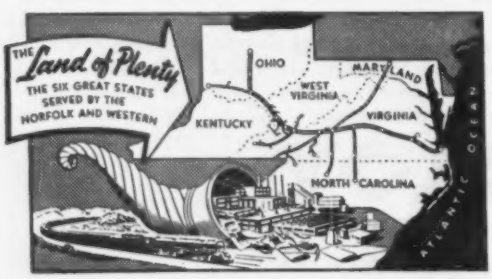
"Food" for steel is abundant in the Land of Plenty

In this mineral-rich territory is a virtually inexhaustible source of superior Bituminous Coal, vast deposits of top-grade limestone and plenty of industrial water. Ore can be transported economically from the strategically located Port of Norfolk on Hampton Roads.

There's also excellent power and an adequate force of friendly, dependable workers.

Considering these major production advantages — plus the availability of many fine industrial building sites — we believe the Land of Plenty is an ideal location for the successful operation of a steel mill.

Recent scientific studies have revealed some impressive facts about the Land of Plenty in regard to its advantages for the steel industry. We invite you to contact our plant location specialists for detailed information, which will be furnished in confidence and without obligation.



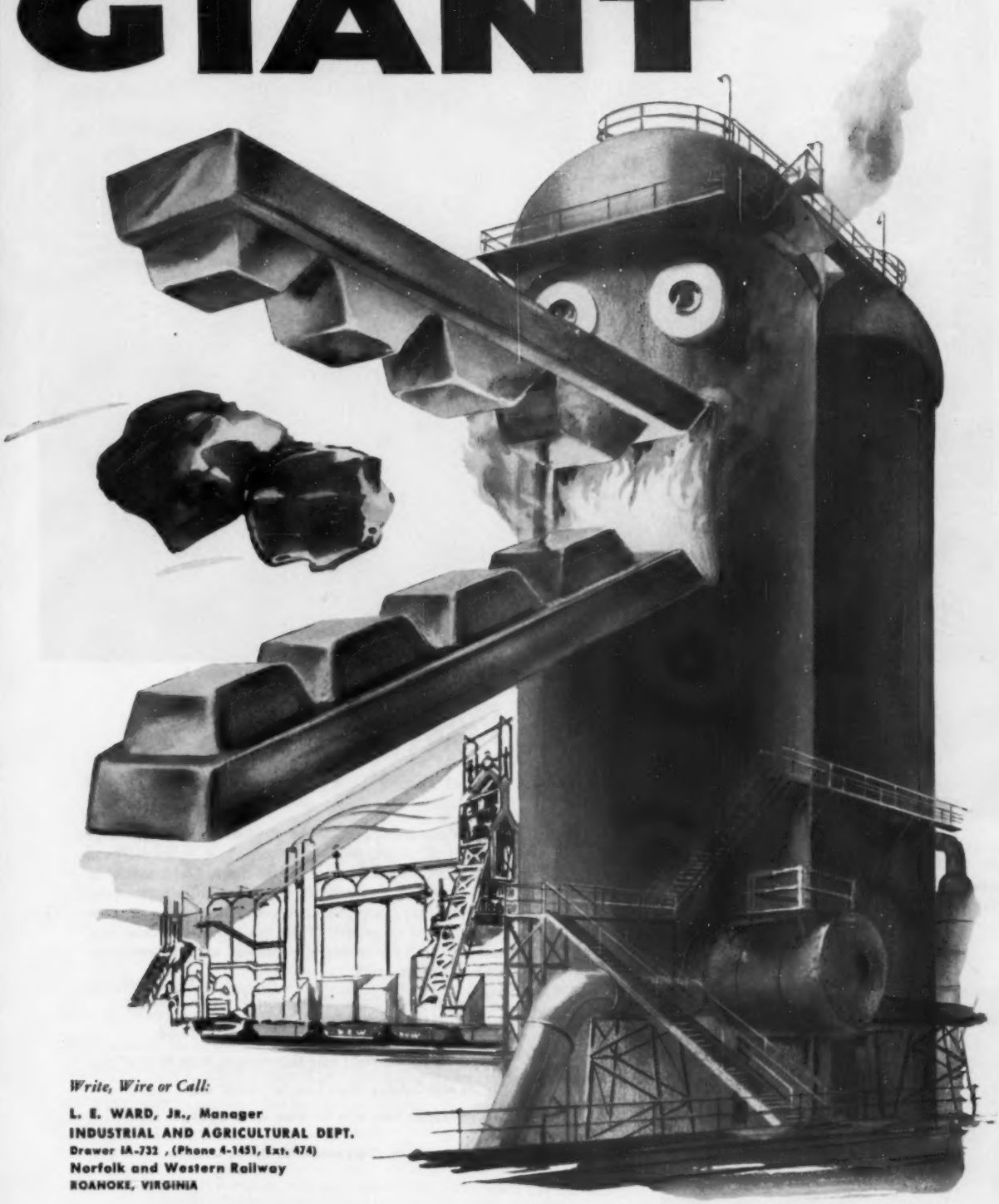
COAL — In the Land of Plenty your steel mill will be "next door" to the world's finest all-purpose Bituminous Coal, dependably transported from mine to mill by the N&W.

WATER — Excellent plant sites are available adjacent to the water you need. The supply is adequate for the needs of a steel mill of any logically conceivable size.

ORE — The short haul from the big modern Port of Norfolk to your production site will save you time and money in the overland transportation of iron ore and other needed mineral imports.

LIMESTONE — At easily accessible points along the N&W there are newly discovered deposits of limestone of almost unbelievable purity. These deposits contain more than 100 million tons in minable beds of over 100 feet in thickness.

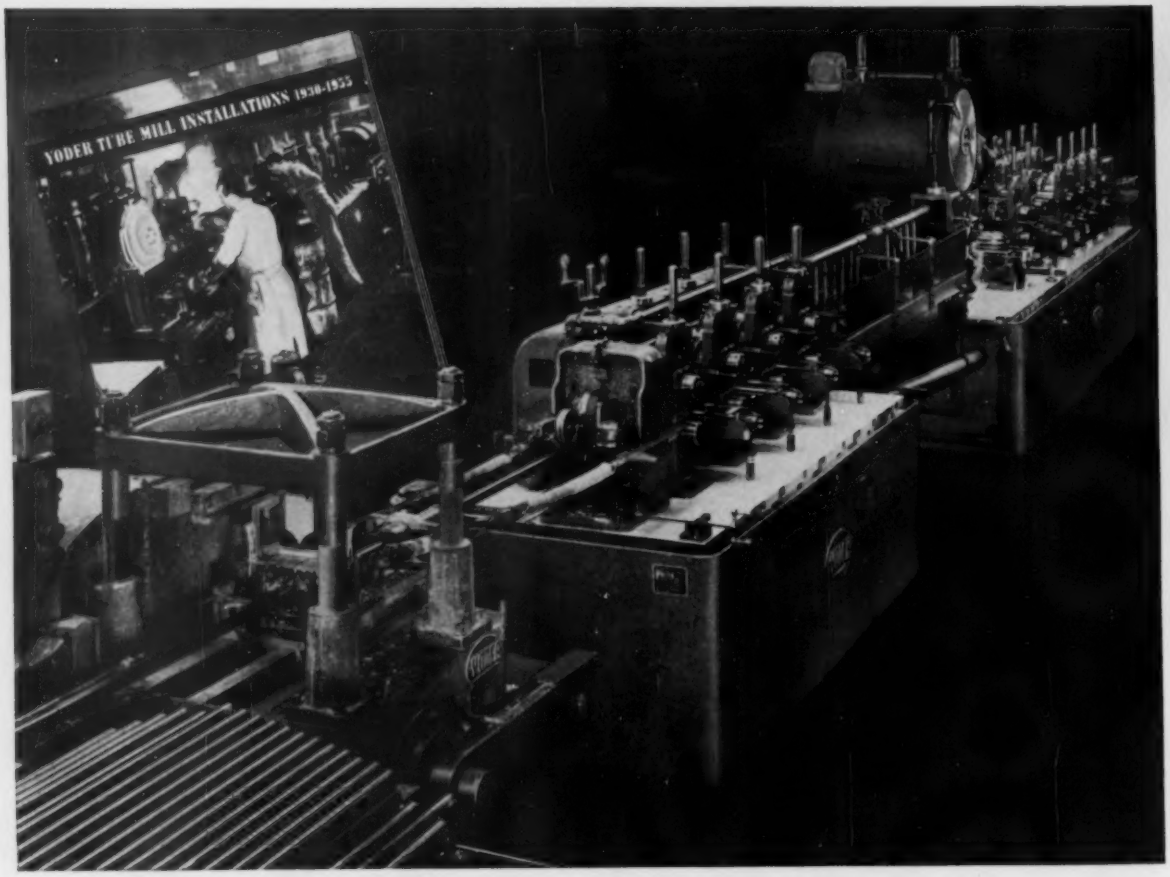
GIANT



Write, Wire or Call:

L. E. WARD, Jr., Manager
INDUSTRIAL AND AGRICULTURAL DEPT.
Drawer IA-732 , (Phone 4-1451, Ext. 474)
Norfolk and Western Railway
ROANOKE, VIRGINIA

Norfolk and Western Railway



500,000 Miles of Pipe and Tubing—

that, roughly, is the estimated production of all Yoder mills for 1956. It represents the bulk of the World's production of electric resistance welded pipe and tubing, because Yoder mills are the overwhelming choice of tube manufacturers everywhere.

Who are the owners of all these Yoder mills, and where are they located? What kinds and sizes of pipe and tubing do they make? How profitable is the business, and what is its record of growth? The answers to these and other pertinent questions may be found in an illustrated *Record of Yoder Tube Mill Installations.* (Ask for a copy.)

The list of owners takes you from Alcoa, Tenn., to places as remote as Amagasaki, Japan; from Imatra, Finland, to Ontario, Calif.; from Bombay, India, to Bridgeport, Conn. Twenty-five nations are represented, girdling the Globe—a forceful reminder that the World will still make a beaten path to the door of the man who makes a better whatnot, be it a mousetrap or an electric-weld tube mill.

As you glance over the pages you will notice, too, a large number of owners who started with one Yoder mill and have since added one or several more. Quite a few of them now have from five to ten Yoder mills. From these facts you may draw your own conclusions as to the phenomenal rate of growth of the business, its profitability, and how well the owners are satisfied with the performance of Yoder mills.

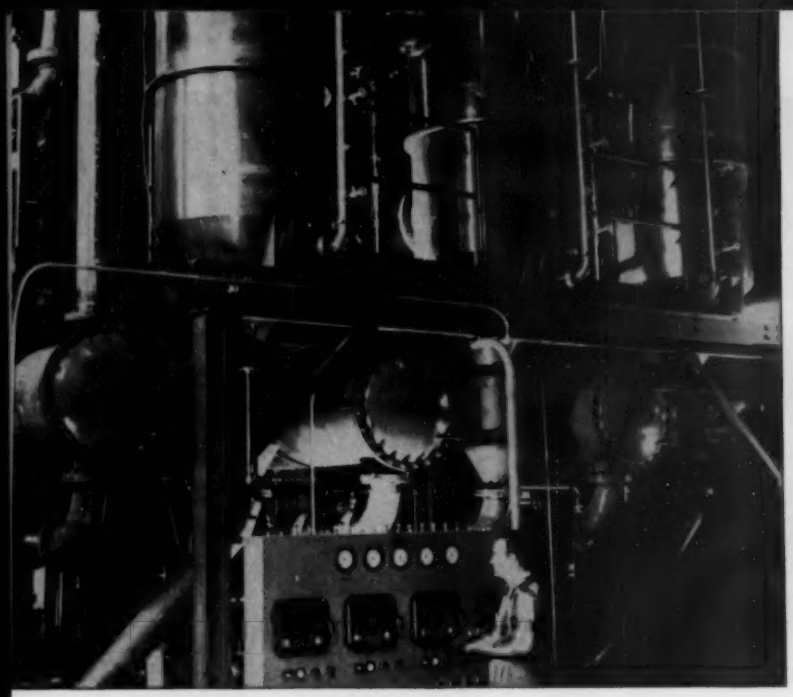
Literature on request. Please check items desired:

- ☐ Record of Yoder Tube Mill Installations, 1930-56
- ☐ Book on Electric-Weld Tube Manufacture, Sizes ⅜" to 4" dia.
- ☐ Pipe Mill Catalog, Sizes from ½" to 24" dia.
- ☐ Non-Ferrous Tube Mills for Sizes up to 8" dia.

THE YODER COMPANY, 5510 Walworth Avenue, Cleveland 2, Ohio, U.S.A.

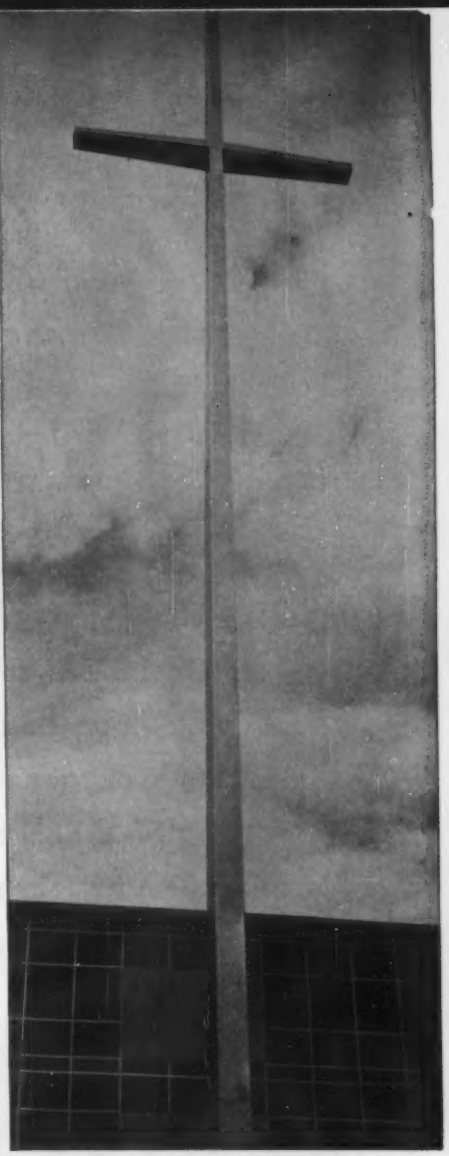
ENGINEERING YODER MANUFACTURING

PIPE AND TUBE MILLS—Electric Weld
ROTARY SLITTING LINES
COLD ROLL FORMING MACHINES



FOR CORROSION RESISTANCE. The Marathon Corporation developed a method of producing lignosulfonates from paper mill sulfite liquor, but it was impractical until Stainless Steel became available in the 1930's. The plant now produces 75 million pounds a year, and 50% of the equipment is Stainless Steel.

NOTHING *can equal* *Stainless Steel*



FOR ENDURING BEAUTY. This great religious symbol is erected on the grounds of St. Patrick's Academy, Chicago, Ill. The Stainless Steel skin furnishes a gleaming, permanent inspiration to all viewers.

• No other design material can match Stainless Steel in its *combination* of desirable properties: corrosion resistance, strength and hardness, beauty, cleanability and easy fabrication. When buying Stainless, remember that United States Steel offers the widest range of types, finishes and sizes available in the United States.

FOR WET, ABRASIVE SERVICE. Here's a Stainless Steel shaker screen in a coal plant. Management says, "Ordinary screens would only last about two weeks, but we can expect three *years* of service from these Stainless Steel screens . . ."

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

SHEETS • STRIP • PLATES • BARS • BILLETS
PIPE • TUBES • WIRE • SPECIAL SECTIONS

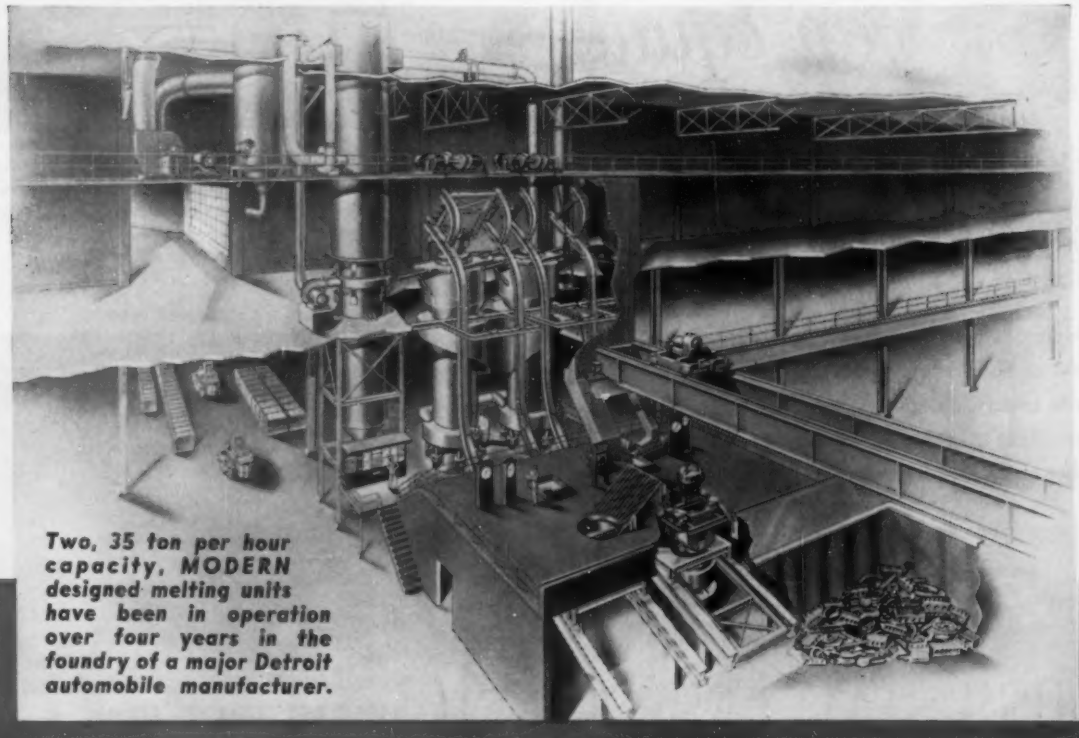
USS

UNITED STATES STEEL

Announcing!

A new, economical source of HOT METAL SUPPLY FOR YOUR MELTING SHOP!

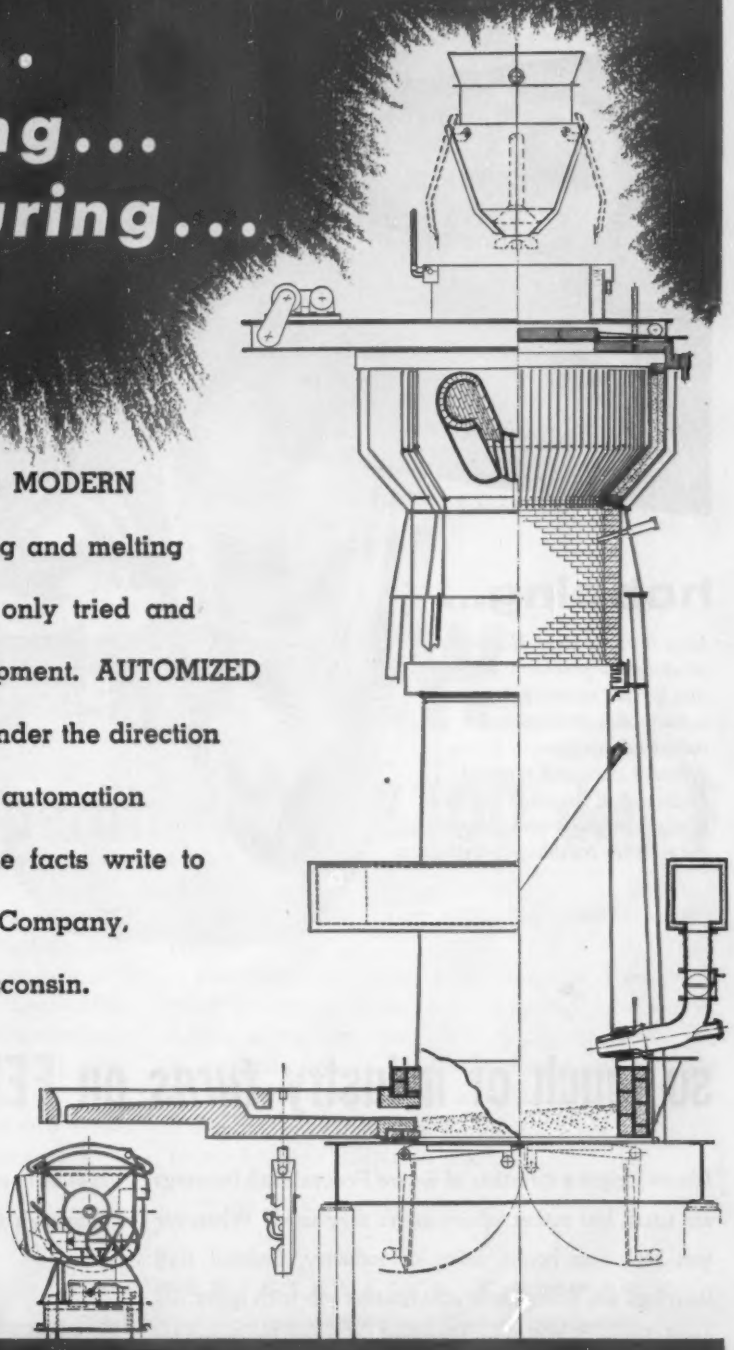
HOT METAL from LOW COST, unprepared scrap for your open hearths, electric furnaces or a new, top-blown oxygen converter is now available. Installation of a MODERN compact and complete cupola melting system in your present plant will increase capacity 30 to 40 tons an hour.



Two, 35 ton per hour capacity, MODERN designed melting units have been in operation over four years in the foundry of a major Detroit automobile manufacturer.

35 YEARS SUCCESSFUL

planning...
engineering...
manufacturing...
erection!



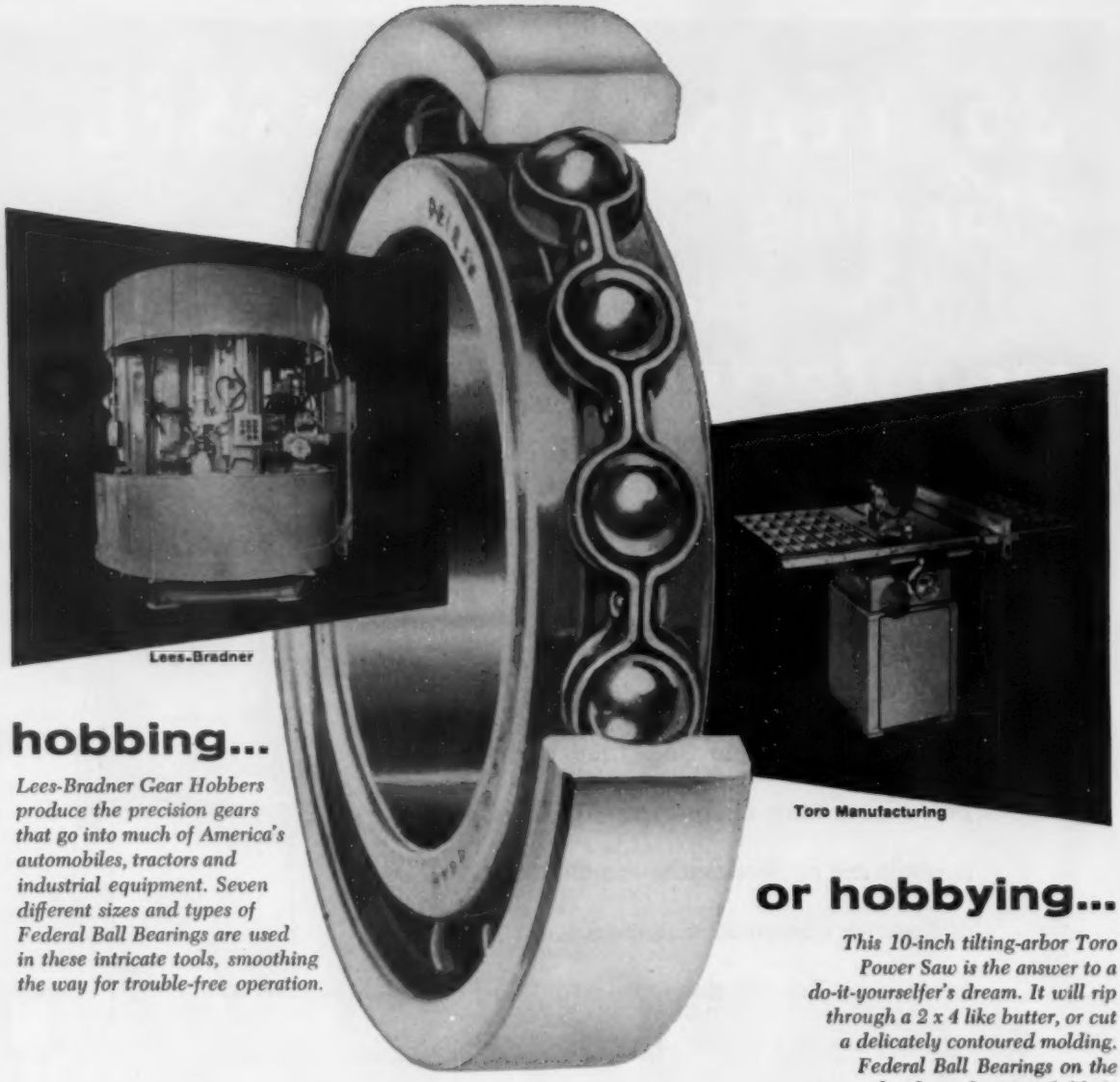
all are reflected in a MODERN ENGINEERED charging and melting system incorporating only tried and proved auxiliary equipment. AUTOMIZED controls are applied under the direction of America's foremost automation engineers: For all the facts write to MODERN Equipment Company, Port Washington, Wisconsin.

MODERN, externally water-cooled cupola.

MODERN

MODERN EQUIPMENT COMPANY
Port Washington, Wisconsin

Complete cupola melting and charging equipment with recuperative hot blast and dust emission cleaning systems.



Lees-Bradner

hobbing...

Lees-Bradner Gear Hobbers produce the precision gears that go into much of America's automobiles, tractors and industrial equipment. Seven different sizes and types of Federal Ball Bearings are used in these intricate tools, smoothing the way for trouble-free operation.

Toro Manufacturing

or hobbying...

This 10-inch tilting-arbor Toro Power Saw is the answer to a do-it-yourselfer's dream. It will rip through a 2 x 4 like butter, or cut a delicately contoured molding. Federal Ball Bearings on the arbor keep the 10-inch blade humming sweetly.

so much of industry *turns* on FEDERAL ball bearings

It's no longer a question of *where* Federal Ball Bearings are used, but rather where *aren't* they used? Wherever you look – in home, office or industry, Federal Ball Bearings are doing their anti-friction job with quiet dependability. 12,000 sizes. Hundreds of types. Produced by a 50-year-old manufacturer of ball bearings exclusively.

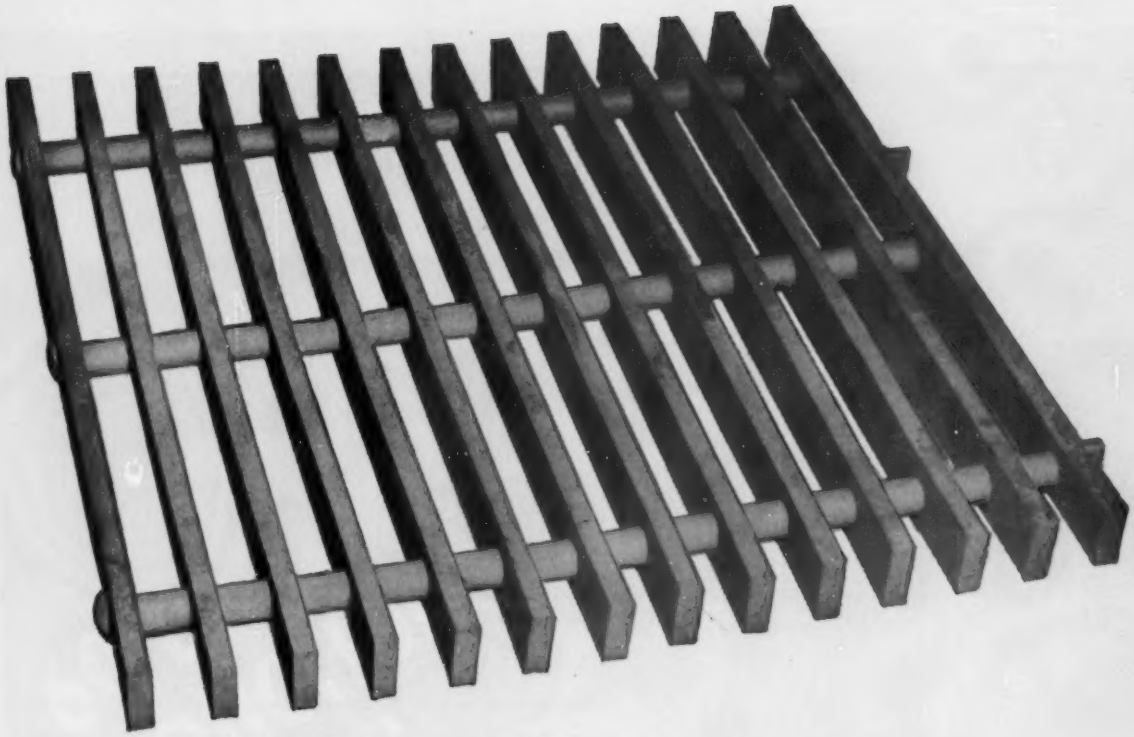
When Federal Ball Bearings are part of so many things you *use*, shouldn't they be part of the things you *make*?

THE FEDERAL BEARINGS CO., INC. • POUGHKEEPSIE, N. Y.

New! Ball bearing and engineering data! *175 pages full in* FEDERAL'S CATALOG! *To get your copy, just write us.*

Federal Ball Bearings

One of America's Largest Ball Bearing Manufacturers



STILL LIKE NEW

. . . After 100 Operations at 2300 deg. F

This tray made of HASTELLOY alloy X has been heated to 2300 deg. F on more than 100 different occasions and still shows no signs of oxidation or distortion. In each cycle the tray is heated to 1300 deg. F for an hour, and then to 2300 deg. F for an additional half hour. Trays made from other materials, and used under the same conditions, failed from oxidation and warpage after a few firing cycles.

The tray is 18 in. square and is fabricated from HASTELLOY alloy X sheared plate. It is used to support heavy molds during a tungsten carbide bonding process.

HASTELLOY alloy X has given similar good service in other furnace applications such as muffles, flame targets, rollers, and heating tubes. It is equally suitable for use in jet engine tailpipes, afterburner components, and other aircraft parts exposed to heat and oxidation.

For complete information on properties and forms, ask for the booklet, "HASTELLOY Alloy X."

HAYNES TRADE-MARK ALLOYS

HAYNES STELLITE COMPANY

A Division of Union Carbide and Carbon Corporation

UCC

General Offices and Works, Kokomo, Indiana

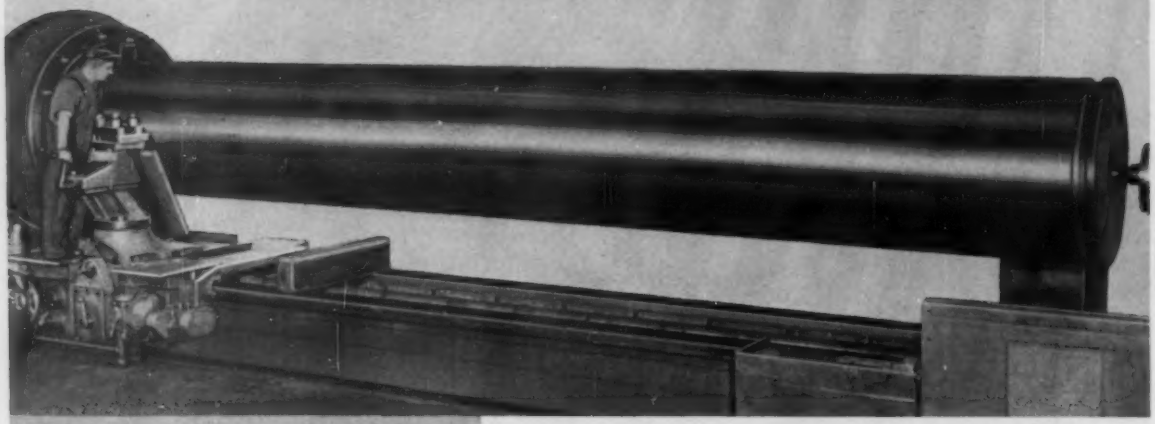
Sales Offices

Chicago • Cleveland • Detroit • Houston • Los Angeles • New York • San Francisco • Tulsa

"Hastelloy" is a registered trade-mark of Union Carbide and Carbon Corporation.

P-54-2706

world's largest stainless steel centrifugal casting



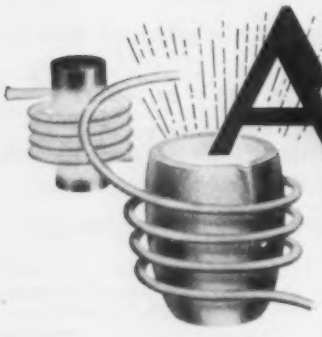
. . . cast by SANDUSKY . . . melted in AJAX Furnaces

Here, at Sandusky Foundry and Machine Co., is Ajax induction melting at its best. Here . . . where furnaces of up to 5 tons capacity melt metal for centrifugal castings weighing up to 20 tons . . . Ajax Northrup induction equipment has simplified techniques, improved casting quality and permitted a cleaner, more efficient shop.

The Sandusky installation typifies a melting technology that has revolutionized foundry procedures . . . casting parts of accurate analysis faster and with less waste. Sandusky also represents extreme flexibility of induction melting. Two motor-generator sets permit complete freedom of choice when selecting melting facilities for a particular job.

These advantages of Ajax-Northrup induction melting equipment can be realized in your foundry . . . whether ferrous, non-ferrous, or both. Write Ajax Electrothermic Corp., Trenton 5, New Jersey, for additional details in Bulletin 27-B.

Associated Companies: Ajax Electric Company—Ajax Electric Furnace Co.—Ajax Engineering Corp.



AJAX NORTHRUP SINCE 1916

INDUCTION HEATING-MELTING

" . . . and this was accomplished without disrupting other work going on in area . . . and, more important, without an accident!"

Early last year, management of a large steel plant decided that its 90" Blooming Mill had to be replaced. Production requirements demanded that the down-time for making the extensive changes . . . including a complete tear-out of the old foundation . . . had to be held to a minimum.

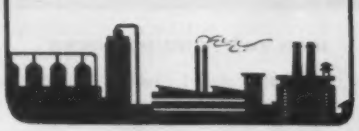
It was at this point that CHICAGO CONCRETE BREAKING COMPANY was called in for consultation. Realizing the vital importance of every hour to the plant, CHICAGO CONCRETE'S skilled blasting experts used a three-dimensional model of the foundations to lay out the drilling pattern. As a result of this careful planning, 95% of the drilling was accomplished PRIOR TO SHUT-DOWN OF THE MILL AND WITHOUT ANY INTERFERENCE WITH PRODUCTION.

Thus, blasting was performed simultaneously with the removal of the mill. Using modern methods, developed over 35 years of experience, CHICAGO CONCRETE was able to control-blast and remove 5,200 cubic yards of concrete and slag SOME 60 DAYS AHEAD OF THE TIME NORMALLY TAKEN BY OLD-FASHIONED METHODS. Needless to say, reconstruction was able to begin well ahead of schedule.

With careful planning, intelligent preliminary work, and skill . . . born of experience and developed over three decades . . . the job was completed in minimum time, ahead of schedule, and without an accident. This is but another example of the service available to you by CHICAGO CONCRETE BREAKING COMPANY . . .

AND NOW

CHICAGO CONCRETE CONSTRUCTION COMPANY offers a complete industrial construction service . . . handling anything from minor masonry, steel or foundation repairs to complete furnace rebuilds.

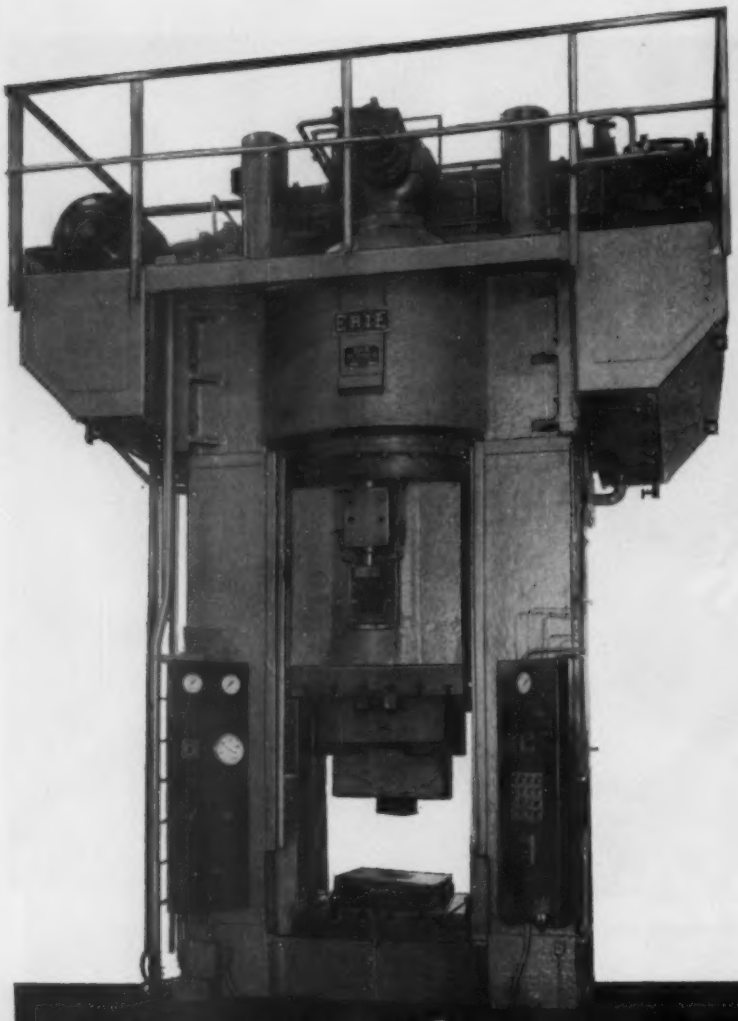


CHICAGO CONCRETE BREAKING CO.

EDWARD GRAY, PRESIDENT

12233 S. AVENUE "O", Chicago 33, Ill., BAyport 1-8400 — PITTSBURGH AREA - 213 Corey Ave., Braddock, Pa., Electric 1-1656

SERVING THE PRIMARY METALS AND OIL INDUSTRIES WITH KNOW HOW, EQUIPMENT AND MANPOWER FOR 35 YEARS



ELECTRO-MAGNETIC CONTROL

All controls are grouped on one accessible control panel which allows delicate finger-tip control by the operator . . . the machine responds *instantly*. This control allows any speed of ram travel in either direction.

SEMI-AUTOMATIC OPERATION

The forging cycle can be pre-set to incorporate any speed and tonnage—advance, press, slow return, fast return.

REMOTE MANUAL CONTROL

Manual control is easily detached from the control panel by the operator who is free to control the press from any nearby position.

HYDRAULIC TOP & BOTTOM STRIPPERS

Can be set to eject the forging from the die at *any* position.

NEW ADJUSTABLE GUIDES

Insure accurate platen alignment and *requires no shimming*. Adjustment can be made in less than an hour.

ERIE FOUNDRY'S NEW HYDRAULIC PRESS

with electro-magnetic control

produces precision forgings

1500-TON FORGING PRESS

platen size:	48" x 48"
opening:	60"
stroke:	48"
speeds—advance:	400" per minute
press:	adjustable from 0" to 52" per minute
slow return:	adjustable from 0" to 52" per minute
fast return:	360" per minute
hydraulic components:	Oilgear with Raytheon Servo-control

The Erie Foundry Hydraulic Forging Press was specially designed for no-draft non-ferrous forging. Modifications of this rigidly built, self-contained machine can be supplied to your forging requirements. For more information, please write.

ERIE

Hydraulic Press Division

ERIE FOUNDRY CO.

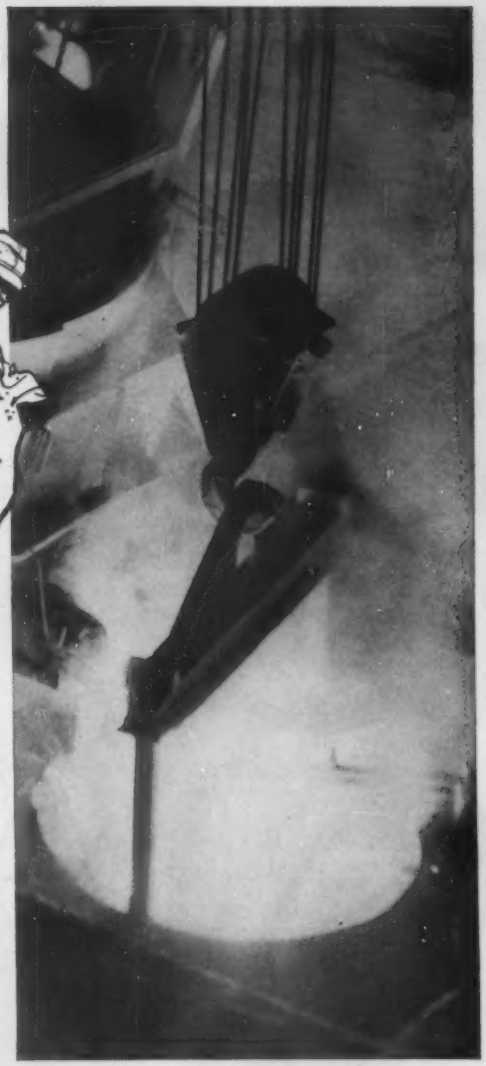
ERIE, PA.

GREATEST NAME IN FORGING MACHINERY SINCE 1895

for steel or non-ferrous metals

FIVE SPECIAL TITANIUM ALLOYS

Whatever your low-carbon titanium requirement, there's an ELECTROMET titanium alloy to suit your melting practice. ELECTROMET produces three standard grades of low-carbon ferrotitanium, each grade containing a maximum of 0.10 per cent carbon. Of special interest to producers of high-quality forgings are the low aluminum and silicon contents of this alloy, which make ELECTROMET ferrotitanium specially suited for the production of forgings having good mechanical properties.



ANALYSIS OF "ELECTROMET" LOW-CARBON FERROTITANIUM

Element	30% Titanium Grade	50% Titanium Grade	70% Titanium Grade
Titanium	27-32%	50-55%	68-72%
Aluminum	0.15% max.	0.15% max.	0.15% max.
Silicon	0.10% max.	0.10% max.	0.10% max.
Carbon	0.10% max.	0.10% max.	0.10% max.
Size	2 in. x Down	2 in. x Down	2 in. x Down

OTHER TITANIUM ALLOYS

Silicon-Titanium		Manganese-Nickel-Titanium	
Titanium	40-50%	Titanium	46.5-48.5%
Silicon	45-50%	Manganese	6-8%
Iron	3.00% max.	Nickel	29-31%
		Aluminum	12.5-14.5%
Sizes: 2 in. x Down, 1 in. x Down, 20 Mesh x Down		Size: 2 in. x Down	

ELECTROMET also produces a silicon-titanium and a manganese-nickel-titanium alloy. Silicon-titanium is available for adding titanium to either non-ferrous alloys or steels where the simultaneous addition of silicon is desired. Manganese-nickel-titanium is available for adding titanium to nickel-base high-temperature alloys.

For additional information about ELECTROMET titanium alloys, please contact the nearest ELECTROMET office listed below.

HALF A CENTURY OF DEVELOPMENT IN FERRO-ALLOYS AND METALS
50th Anniversary
Electromet
1906 ... 1956

ELECTRO METALLURGICAL COMPANY

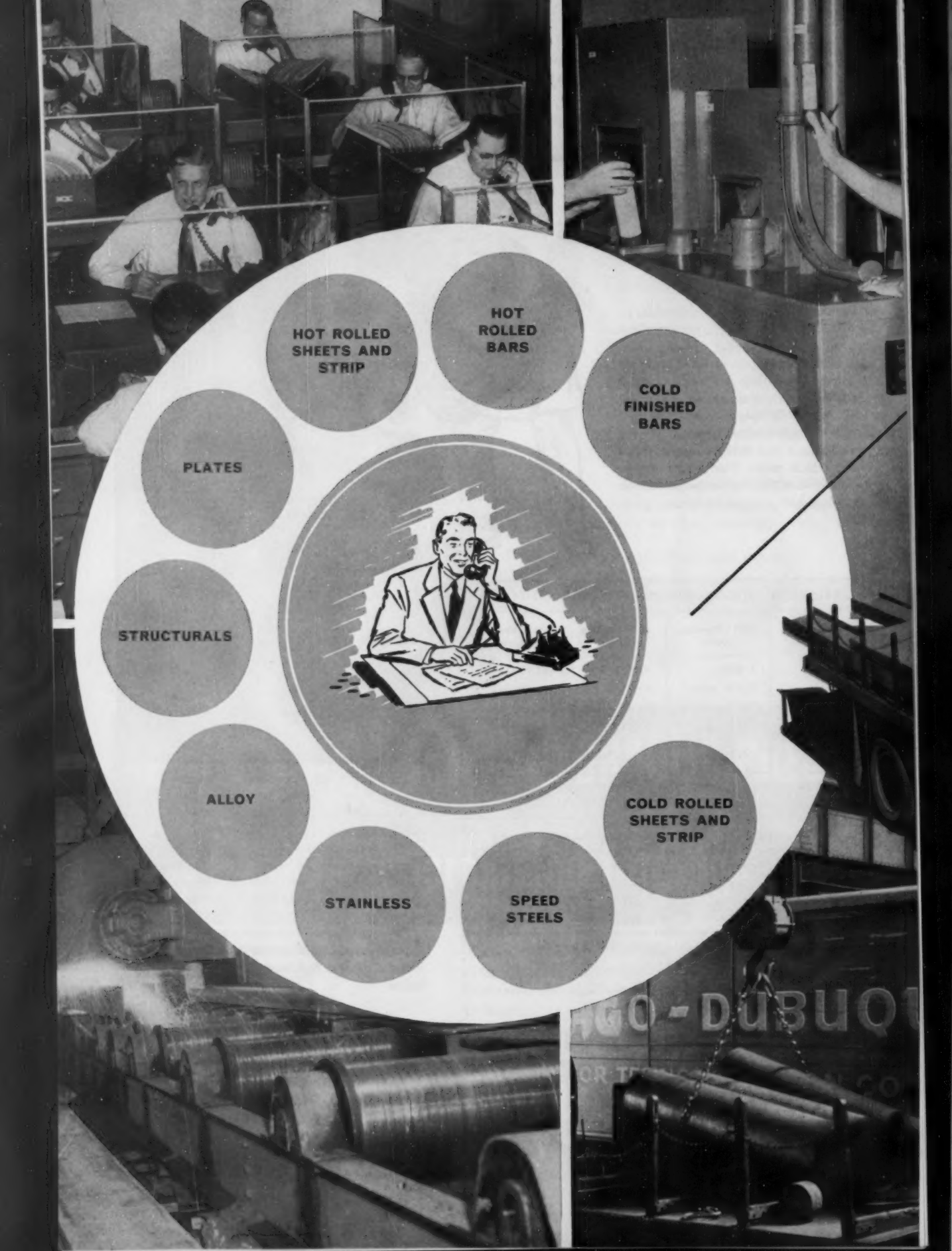
A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

OFFICES: Birmingham · Chicago · Cleveland · Detroit
Houston · Los Angeles · New York · Pittsburgh · San Francisco

In Canada: Electro Metallurgical Company,
Division of Union Carbide Canada Limited, Welland, Ontario

The term "Electromet" is a registered trade-mark of Union Carbide and Carbon Corporation.


HOT ROLLED SHEETS AND STRIP
HOT ROLLED BARS
COLD FINISHED BARS
PLATES
STRUCTURALS
ALLOY
COLD ROLLED SHEETS AND STRIP
STAINLESS
SPEED STEELS

Dial your J & L Warehouse for fast steel service

Your J & L Steel Warehouse
is as near as your telephone and is ready
to serve you with complete and diversified stocks,
complete processing facilities and prompt delivery.
Convert costly storage space
into profitable production space . . .
make your J & L warehouse
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This accurate Cincinnati

Fan casings.

Press Brake saves money and time...

Photos courtesy of Anchor Metal Spinning Company.

at ANCHOR METAL SPINNING CO.
Dayton, Ohio

Profitable production has been achieved by installing this Cincinnati Press Brake.

Accurate flanging of fan housings is done rapidly while meeting the rigid requirements for squareness. Operations on different sizes and gauges of materials are performed with ease. Parts for assembly are ready on time and smooth shop operation maintained.

Write for Bulletin "2 New Cincinnati Press Brakes" for complete information on these versatile machines.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

"We have no operating problems

Midwest Metal Stamping reports results of 8 years of press operation using STANOIL

In 1948, Midwest Metal Stamping Company, Kellogg, Iowa, put into service a Bliss Hydro Dynamic Press. STANOIL Industrial Oil was selected as the hydraulic medium. The initial fill was 1,400 gallons. The press operated continuously from 1948 until Christmas, 1954, when it was shut down five days for overhaul.

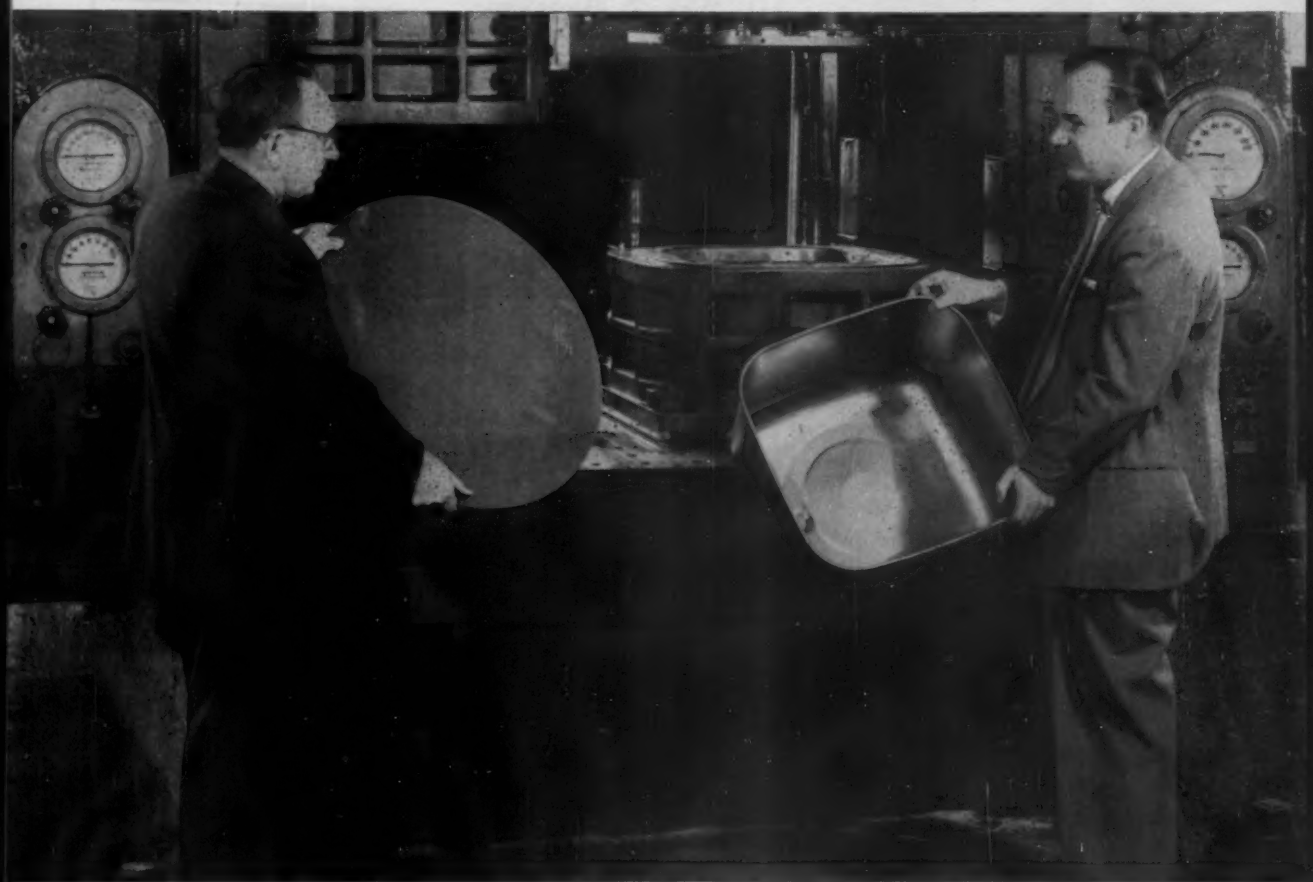
Stamping being removed from press by operator George Johnson. Press has used STANOIL Industrial Oil as hydraulic medium for eight years. Oil has perfect performance record.

At the time of overhaul, the STANOIL Industrial Oil was drained. And here STANOIL's superior demulsibility was demonstrated. Due to the high rate of condensation, two barrels of water were removed from oil reservoir. An oil analysis in the Standard Oil laboratory proved the oil still suitable for continued service. After filtration, it was returned to the reservoir and the press put back in operation. STANOIL continues to deliver the same perfect performance for Midwest as before.

STANOIL Industrial Oil can perform just as efficiently for you. Find out. There is a Standard Oil industrial lubrication specialist near you in any one of the Midwest and Rocky Mountain states. Call him. Or write Standard Oil Company, 910 South Michigan Ave., Chicago 80, Illinois.

when we use STANOIL Industrial Oil"

Don Foster, Midwest Stamping Purchasing Agent and Jesse Nelson (right), Standard Oil industrial lubrication specialist, display metal blank and finished tub turned out on Bliss press. Technical service on lubrication problems is Jesse Nelson's job. He's been doing such work for seven years. Jesse has an engineering degree from the University of Iowa and is a graduate of the Standard Oil Sales Engineering School. Customers find this experience and training pay off *for them.*



STANDARD

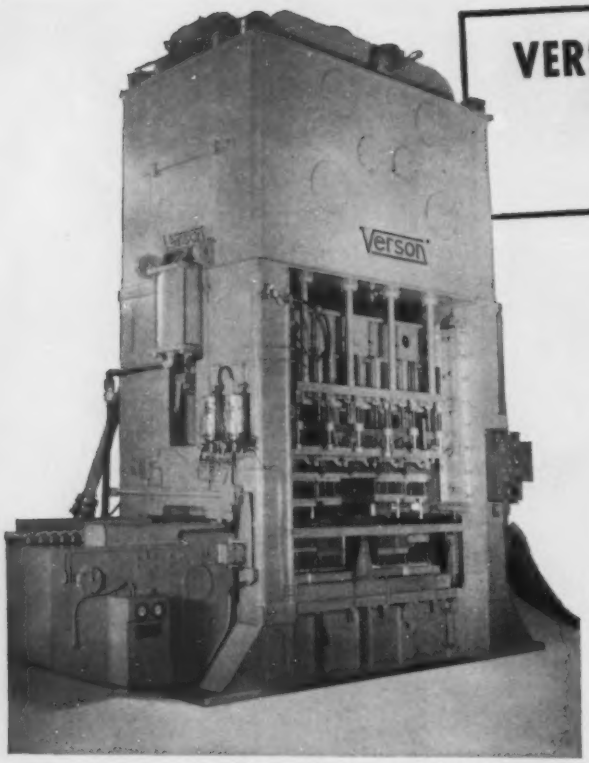
STANDARD OIL COMPANY
(Indiana)

Quick facts about ***STANOIL*** *Industrial Oil*

- **Special refining and an additive, exclusive with STANOIL, make this industrial oil resistant to chemical change.**
- **In all grades of STANOIL that need it, an advanced type corrosion inhibitor is added. Inhibitor "plates out" on metal surfaces, prevents rust.**
- **Selective refining and special additives give STANOIL low pour point. STANOIL flows freely at low temperatures.**
- **High viscosity index of STANOIL is indication of the oil's ability to resist change at any operating temperature.**
- **No foam, no emulsion with STANOIL. STANOIL's special additive and selective refining minimize or eliminate these oil problems.**
- **Low carbon forming tendencies of STANOIL reduce or eliminate this problem.**

There is only one primary reason
for buying a Transmat press . . .

LOWER UNIT COSTS WHERE PRODUCTION



TYPICAL 500 TON VERSON TRANSMAT—This is the press that produces the valve covers described at the right. Today's Verson Transmat is the culmination of twenty years of specific development of an automatic process to produce multiple operation stampings. Since the installation of the first Transmat eighteen years ago,* the machine has progressed to the point where there is no limit to tonnage capacity or size of piecepart that can be produced. Transmats as small as 100 tons and as large as 4000 tons have been built.

*Still in service, producing 1300 oil filter shells per hour.

VERSON TRANSMAT PRESSES
are engineered and built to give you this economy

If you produce any part requiring four or more operations on 4000 or more pieces per day, Verson Transmat Presses offer remarkable opportunities for cost reduction.

The Verson Transmat is designed and built solely for the purpose of producing multi-operation stampings at the lowest possible cost. Design is not compromised in any way that will affect this objective! As a result Verson Transmats offer a combination of advantages available in no other transfer press—

- High speed—20, 25 and even 36 strokes per minute with machines having capacities up to 4000 tons.
- Positive, direct, gear driven transfer mechanism with safety interlocks make misfeeding impossible.
- Non-oscillating feed bars, only the fingers move in and out—fast, smooth action.
- Automatic, delayed action, adjustable stroke knockout cylinders at each station—prevents damage to piecepart by positive stripping and location.
- Individual adjustable wedge slides for precise die adjustment.
- Fully automatic lubrication—two Cascade oil flow systems and two pressure systems.

When you buy a transfer press be sure you get the high production you are paying for. Be sure you get the efficient, trouble-free operation that Verson know-how assures you. Described at the right are a few of the jobs being performed successfully at this moment. We'll be happy to tell you about others . . . and we'll welcome the opportunity to show you what Transmats can do for you. Write or phone.

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

-Verson-

VERSON ALLSTEEL

9314 S. Kenwood Avenue, Chicago 19, Illinois

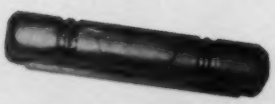
MECHANICAL AND HYDRAULIC PRESSES • TOOLING • TRANSMAT

ON JOBS REQUIREMENTS ARE HIGH

Here's Proof

of what VERSON TRANSMATS can do

These are verified production figures of a few of the Transmats in use in metalworking plants at this moment.



20⅜" x 3⅝" x 2¾"—18 ga. stock.

1,200 VALVE COVERS PER HOUR

Five operations on each, a total of 6,000 press operations per hour. The part is formed from strip. Two such presses are currently in operation, both since 1954.

5" diam. x 2¼"—16 ga. stock.

1,500 MOTOR HOUSINGS PER HOUR

Ten operations on each, a total of 15,000 press operations per hour. The part is formed from strip. One 600 ton Transmat has been in operation for over one year.

7" diam. x 4"—20 ga. stock.

900 HEADLAMP HOUSINGS PER HOUR

Six operations on each, a total of 5,400 press operations per hour. The part is formed from pre-blanked stock. Five 250 ton Transmats of this type are in service, the earliest since 1949.

19½" x 3¾" x 5½"—.1606" stock.

1000 AXLE HOUSINGS PER HOUR

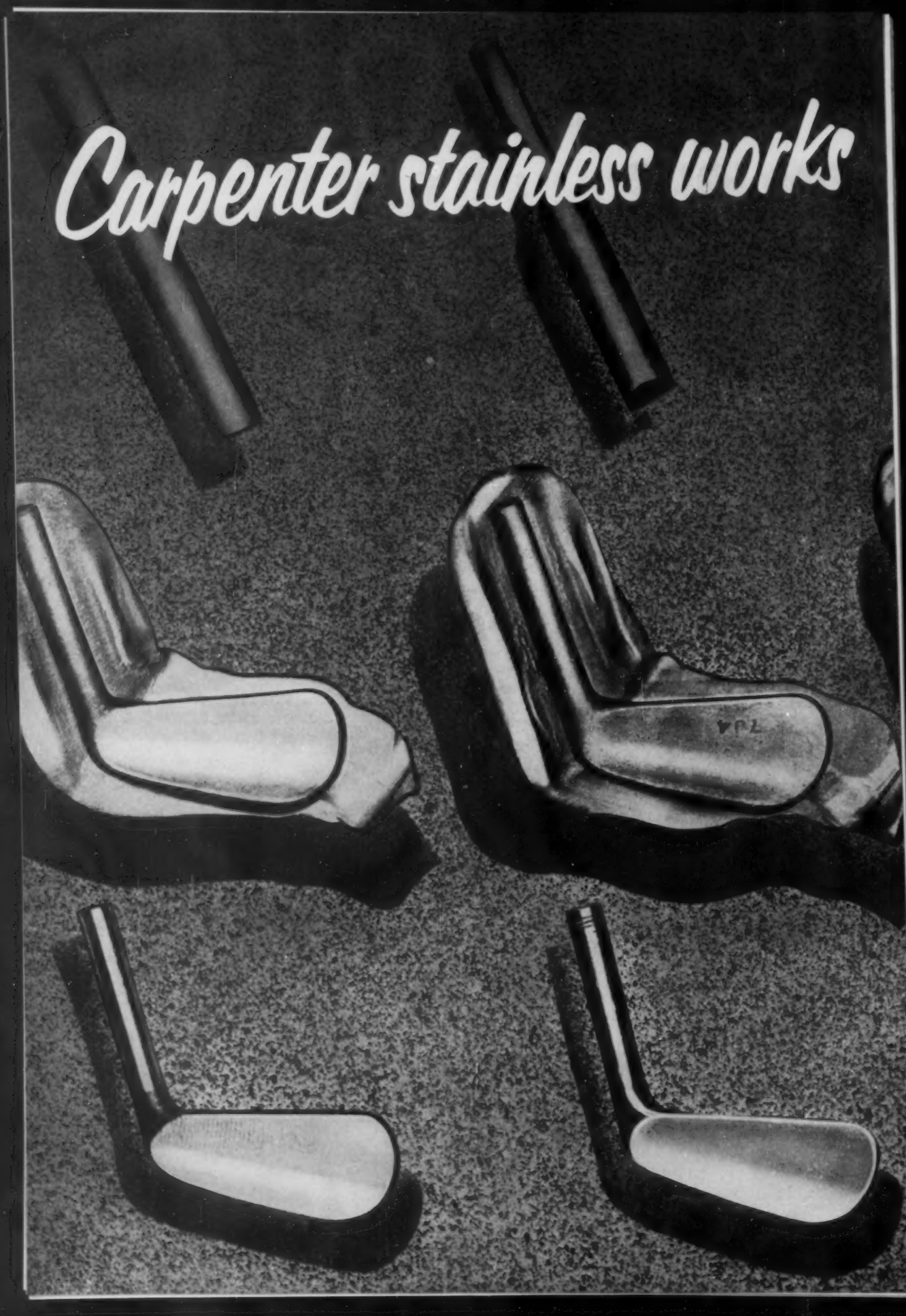
Seven operations on each, a total of 7,000 press operations per hour. The part is formed from previously developed blanks. Two such 2,200 ton Transmats have been in service for about one year.

PRESS COMPANY

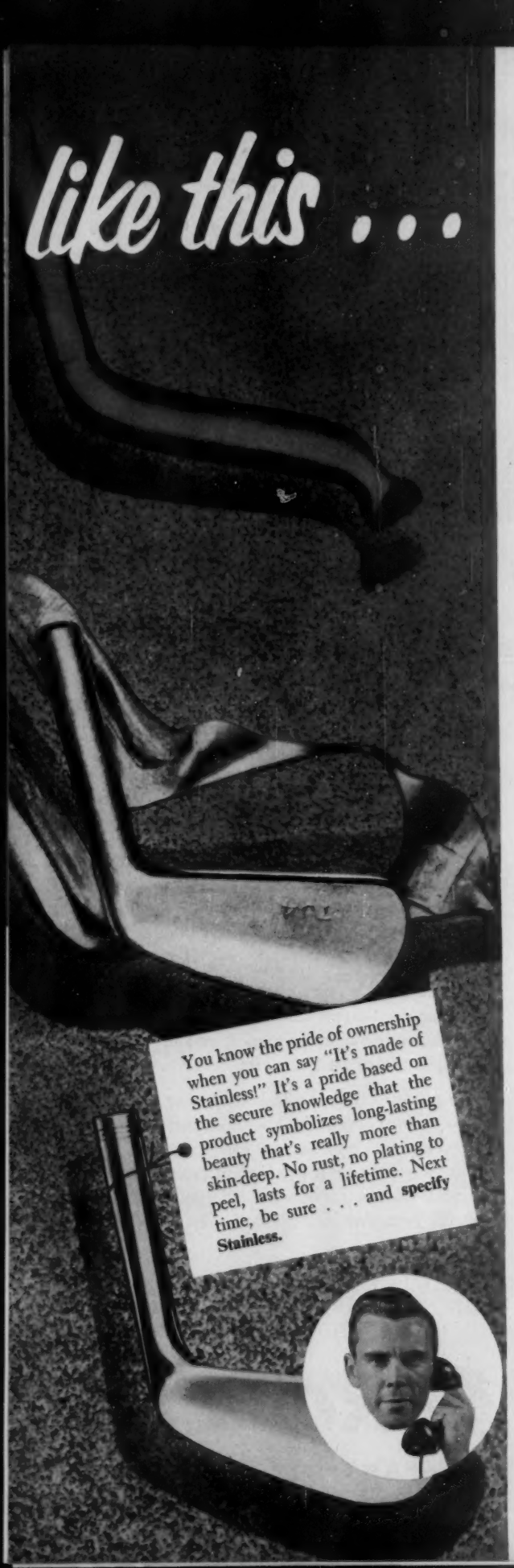
8300 S. Central Expressway, Dallas, Texas

-Verson-

PRESSES • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES


Carpenter stainless works

like this . . .


You know the pride of ownership when you can say "It's made of Stainless!" It's a pride based on the secure knowledge that the product symbolizes long-lasting beauty that's really more than skin-deep. No rust, no plating to peel, lasts for a lifetime. Next time, be sure . . . and **specify Stainless.**

because of *consistent* uniformity bar after bar

when you want *RESULTS* . . .

in definitely improving fabrication of stainless steel, call Carpenter. For example, some time ago a large manufacturer of golf clubs asked Carpenter's help in changing to stainless for golf club heads. Some of the big problems involved were the many unfamiliar stainless fabricating operations (such as cold trimming, broaching, drilling, tapping, stamping, etc.). These operations made a uniformly free-machinable grade highly necessary. A Carpenter Free-Machining Stainless of "forging quality" proved its ability to take the severe forging operations involved, with no change in previous fabricating techniques. Through the years, this Carpenter grade has helped the company build product acceptance and user satisfaction.

when you want *ACTION* . . .

on your free-machining stainless needs, dial your nearest Carpenter Mill-Branch Warehouse, Office or Distributor. Immediate delivery from large local stocks is more than a claim . . . it's a fact . . . with Carpenter. Turn valuable plant space you've been using for in-plant steel inventory into profitable production space. Let your Carpenter Warehouse save you the cost and trouble of maintaining large stocks of specialty steels. Whether you want a few pounds or a few tons, Carpenter can get it to your plant faster. Dial the Carpenter location nearest you for service the way you want it.

Carpenter STEEL

Free-Machining Stainless Steels

The Carpenter Steel Company, 121 W. Bern St., Reading, Pa.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y. — "CARSTEELCO"

Mill-Branch Warehouses, Offices and Distributors in Principal U. S. Cities

COMMENT AT THE METAL SHOW!

"This is the

Forgive us the informality of our headline. A lot of people at the Metal Show made this comment so we use it instead of the conventional superlatives.

A completely new furnace No elements, no burners, no electric or gas connections in it Circular shape reduces temperature losses, saves floor space Greatly lowered maintenance costs More accurate temperature control Quiet, automatic, fool-proof.

There just never has been a heat treating furnace like this new Lindberg Induct-O-Ring. Radically different, it has no elements, element terminals, burners, electric or gas connections in the furnace proper. The chamber, lined with a heat-resistant alloy muffle and deeply insulated, is heated by induction. All the heat is in the chamber and the work load.

Heating efficiency is high and the heating rate spectacular, with hardening temperatures reached in 17 minutes from cold. Temperature control is highly accurate and precise and temperature override and lag is eliminated for all practical purposes.

With no burners or heating elements maintenance costs and down-time are materially reduced and atmosphere requirements held at a minimum.

The Induct-O-Ring's circular shape eliminates door-opening heat and atmosphere losses and saves floor space. Actually, it is possible to have 30 feet of furnace length in a 5 foot diameter unit.

Operation of the furnace is extremely simple. Work load is automatically charged and moved through the work chamber by a gentle reciprocating movement of the entire furnace. Work is then automatically discharged into quench tank.

The Induct-O-Ring is built like a fine machine tool. Sealed ball bearings support the moving parts of the furnace. Quench tank, quench conveyor, circulation and cooling of the quench are all self-contained.

The furnace is completely adaptable to automated production processes where its precise heat control, negligible maintenance, and dependable operation are of particular importance.

We are sure that the Induct-O-Ring offers an entirely new concept in heat treating efficiency and economy. You can very easily find out how it can be used in your production processes. Just call your nearest Lindberg Field Representative (consult your classified phone book).

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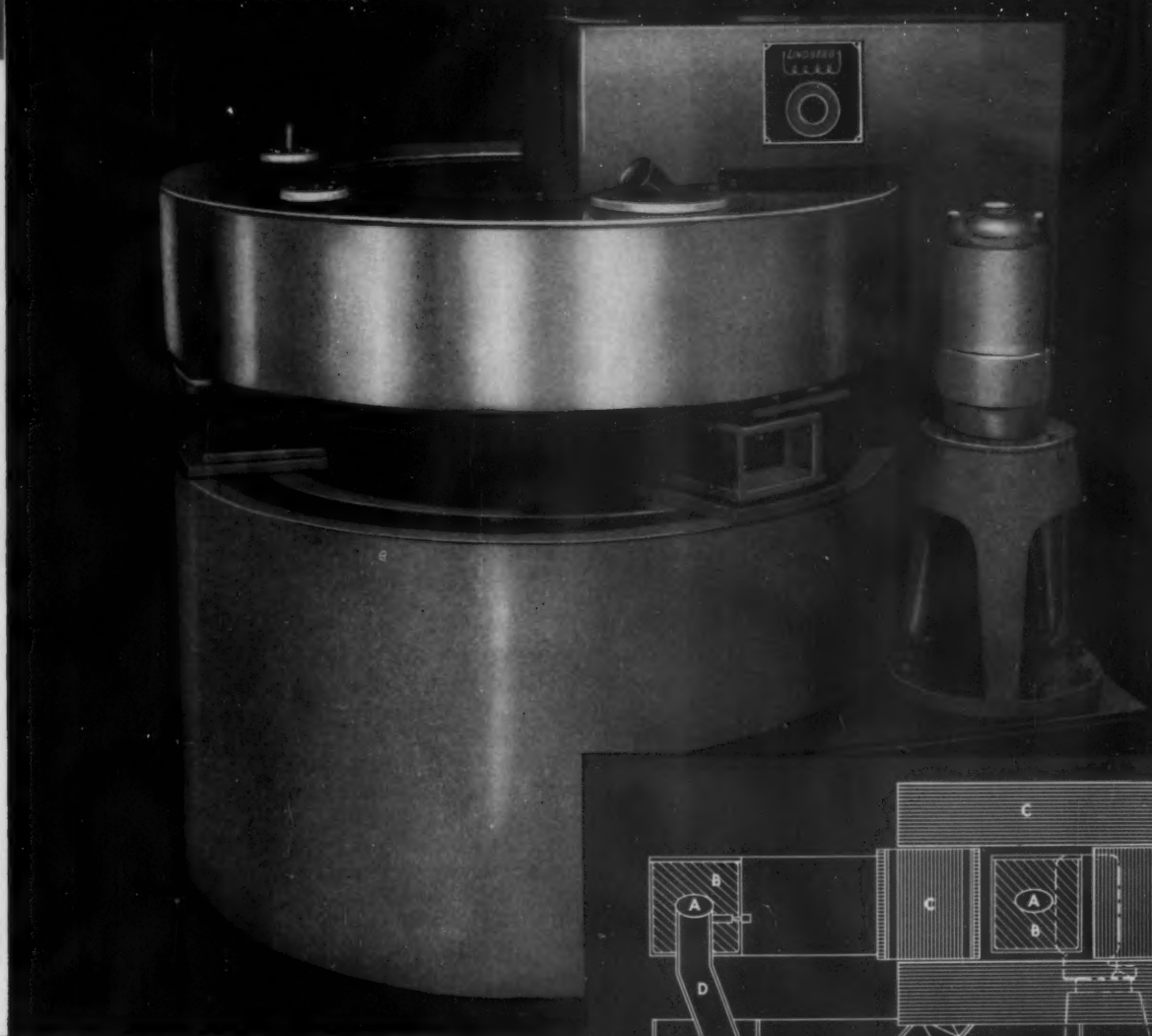

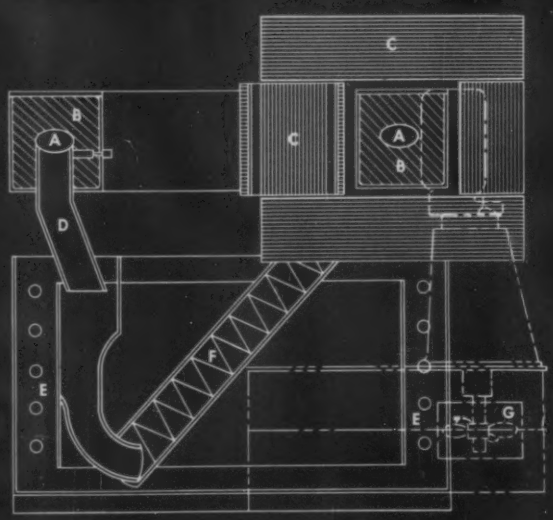

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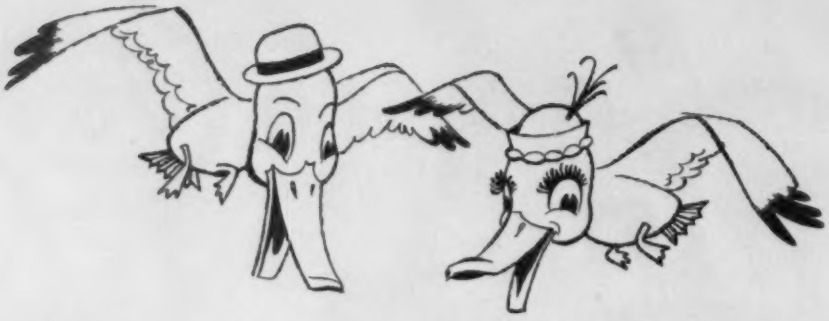
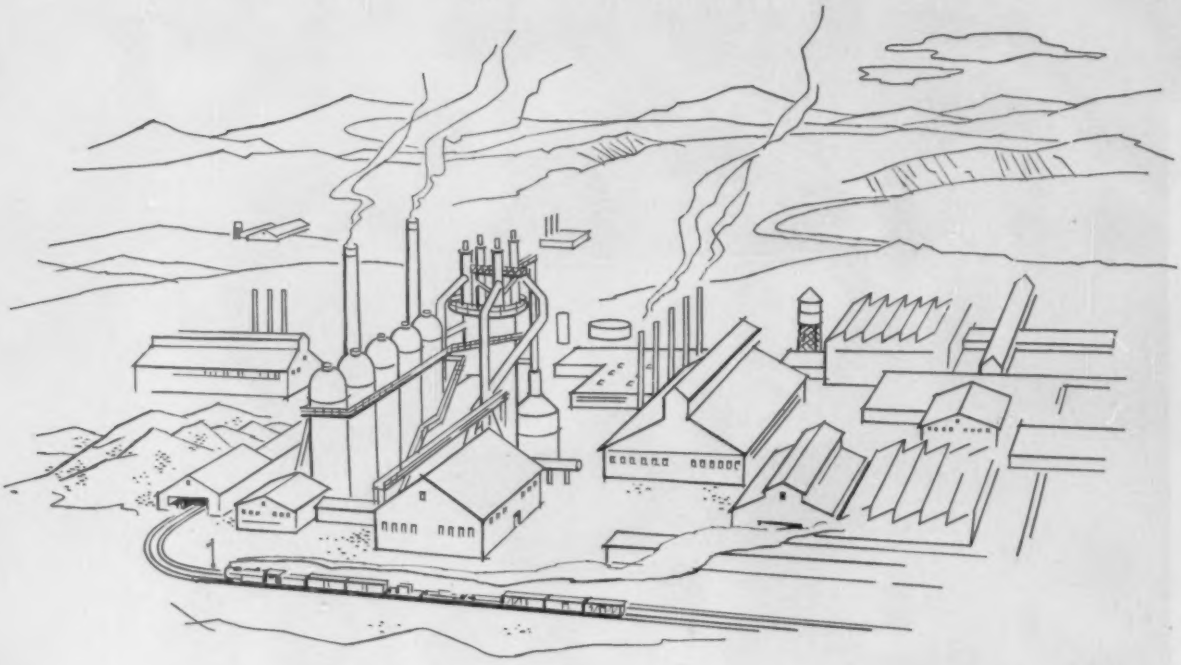
E. COOLING COILS
F. QUENCH CONVEYOR
G. OIL CIRCULATOR

*U. S. and foreign patents pending



Production is smooth as water rolling off your back!



No wonder: **SKF**® has developed a roll neck mounting that meets the demands for higher speeds, closer gauge tolerances, better quality and heavier rolling loads. This multi-row has the features desired by every mill man – most usable capacity in a given space... easy to assemble and disassemble... uses oil or grease, even at high finishing stand speeds.

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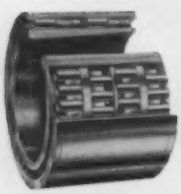

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Designed around the principle used in the famous Blaw-Knox Medart 2 roll Rotary Straightener, the 2 & 2 Universal Straightener is especially adapted for high speed applications. It is widely used in a direct production line with a draw bench for high speed straightening of cold drawn bars.

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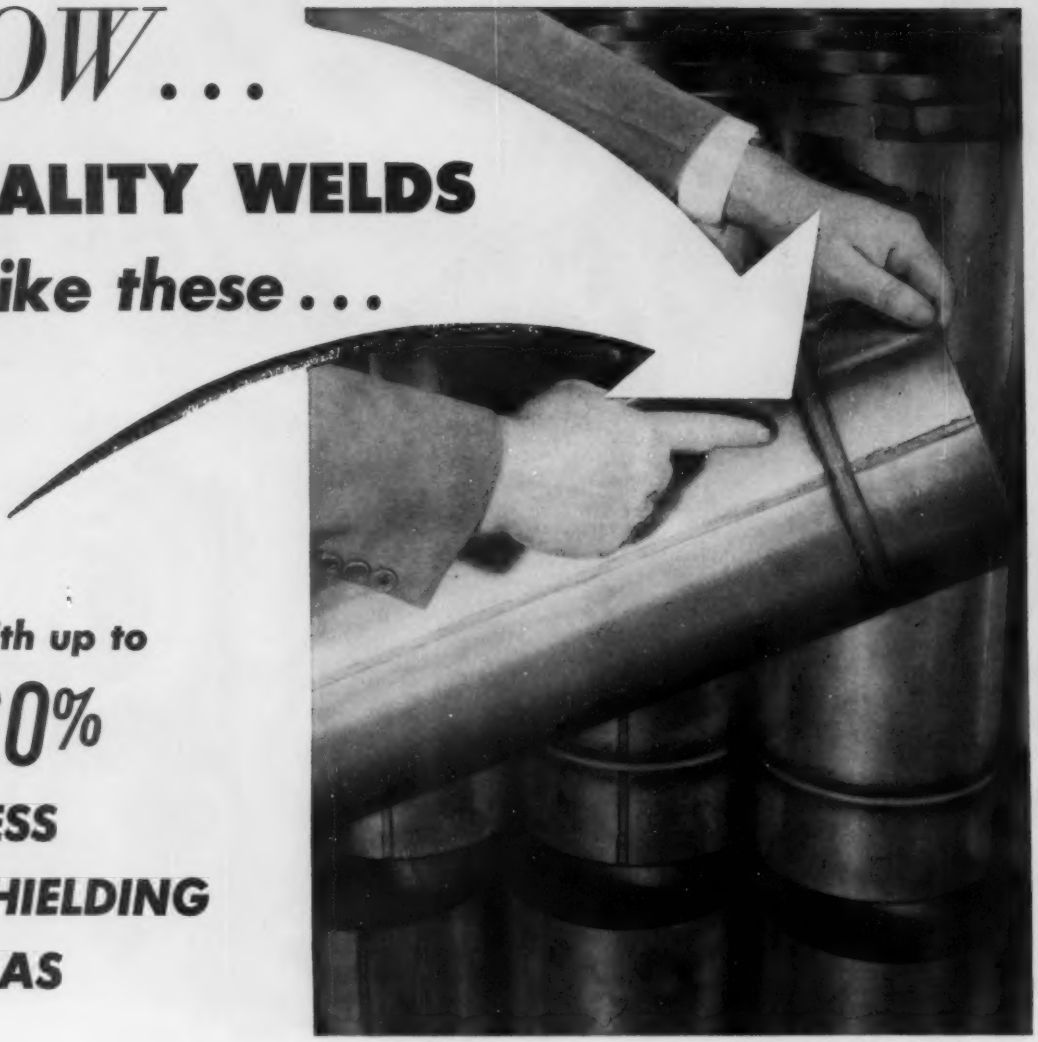

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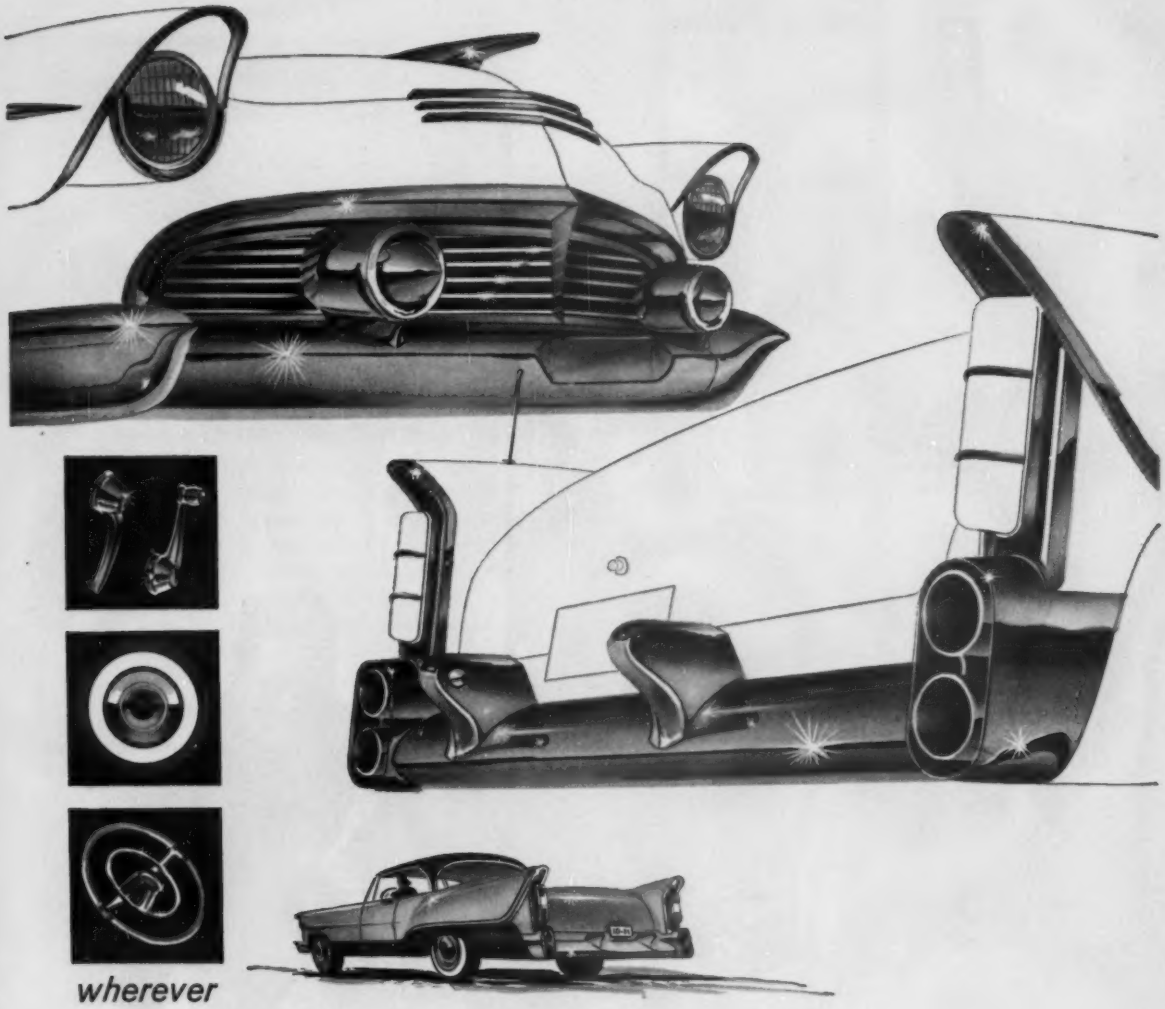

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WHEN MIGHTHOOD WAS IN FLOWER

From the time of the Pyramids until just recently, heavy construction required "gangs" of men. Today, giant machines supply most of the muscle. In our lifetime, an aggressive construction industry has astounded the nation with its everyday miracles. Steel has played its part by developing better-forming, higher strength steels that have resulted in roads, bridges and buildings that last longer, look better and perform more efficiently. These same steels have also helped make possible the modern tools that dig and pound, lift and haul. An important job at Inland is supplying the *right* steels for building and for the tools of building.

INLAND STEEL COMPANY *38 South Dearborn Street, Chicago 3, Illinois. Sales Offices: Chicago, Milwaukee, St. Paul, Davenport, St. Louis, Kansas City, Indianapolis, Detroit, New York. Steel products supplied to the construction industry include plates, structural shapes, 4-Way safety plate, piling, Ti-Co galvanized sheets, Hi-Bond reinforcing bars, sub-purlins. Other products: hot and cold rolled sheets and strip, tin mill products, rail and track accessories, coal chemicals.*

INLAND

NEWSFRONT

Powder Metals: New Part in Atomics

Brand new market in field of atomics is opening up for powder metals. For reasons not completely understood, researchers find the powder product shows a marked superiority in withstanding damaging effects of radiation. Specific applications are still being worked out. But the unique characteristic is expected to help boost sales significantly.

Warehouses Sell More Stainless

Stainless producers are eyeing steel warehouses with increased respect. Reason: results of a 6-month study of shipments of stainless by warehouses. The survey shows that warehouses are accounting for larger percentages of sales than are the mills on several important stainless steel products.

Carbides for Carbide-Cutting

Super-hard carbide tools can simplify problems encountered in shaping some of the softer carbide die materials. Research indicates the extra-hard tools—some still in development stage—will cut softer carbides smoothly, without heat checking or tool breakage. Die-grades containing near 30 pct cobalt cut well.

Plastic Pipe Takes New Twist

A new plastic pipe soon to appear on the American market promises steel pipe more competition. Comparing favorably with PVC on physicals, the pipe is reported to withstand pressures to 40,000 psi; to offer corrosion resistance to a wide variety of agents including organic acids. Pipe's ease of forming (it's plastic combined with vegetable fibers) may make it attractive for heat-exchanger use.

Ultrasonics — Bright Nuclear Future?

Nuclear energy's growth alone may prove big boost to ultrasonic testing. It's already finding wider use in checking conventional-powerplant tubing, generator shafts, piping, etc.; will step up even more with growth of reactor projects. Reason is simple. Materials failure and accompanying radiation may make equipment difficult if not impossible to repair. Hence increased emphasis on ultrasonic, other testing to make sure job is right first time around.

New Shear Saves Blanking Dies

Evolved from a WW II prototype which operated at 120 strokes a minute, a new 2-ft shear is in high production for aircraft plants. Unit permits cutting out odd-shaped straight line pieces from aluminum sheet stock up to ⅛-in., without the time and expense of blanking dies. Automated production lines working off coil sheet stock may offer biggest market.

Lathe-Maker Turns to Ductile Iron

Ductile iron castings, widely adopted for turret lathes, other machine tools by one Ohio firm, are producing important machining economies. Now used for more than 270 different castings, ductile iron replaces malleable or gray iron. Compared with Class 40 cast iron, the company reports 60-45-10 ductile shows up 80 to 90 pct better in machining operations.

More Scrap Slated for Japan?

Japan wants more U. S. iron and steel scrap. Now taking 1.8 million tons worth a year (for the 12 months beginning next April), Japan is held down by present cargo-for-cargo scrap export rules applying to all countries. State Department officials haven't been approached yet, but are aware request to raise totals to about 2.3 million tons is coming.

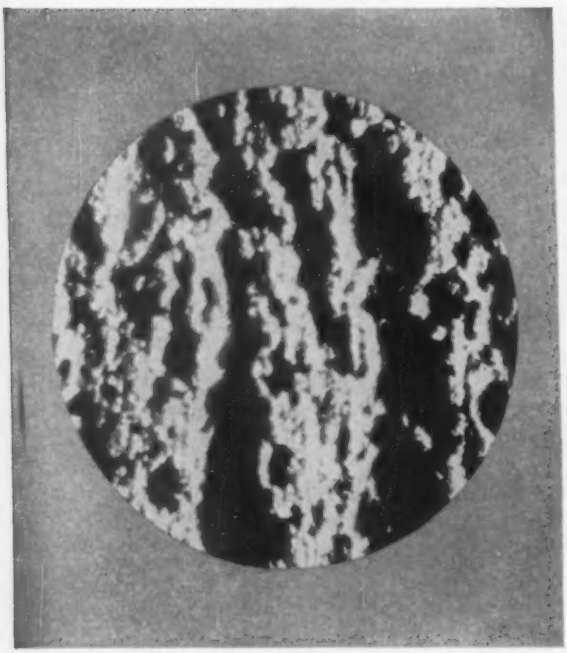
Army Field-Tests New Supply System

Now underway in Europe: tests of a new system for keeping military hard goods in running shape. Called the Modern Army Supply System —MASS for short—the system involves selective stocking of those repair parts consumed in the shortest time; rapid transmission of requisitions from users to U. S. stock control centers, and priority transportation of parts. Non-stocked parts are air-hauled from U. S.

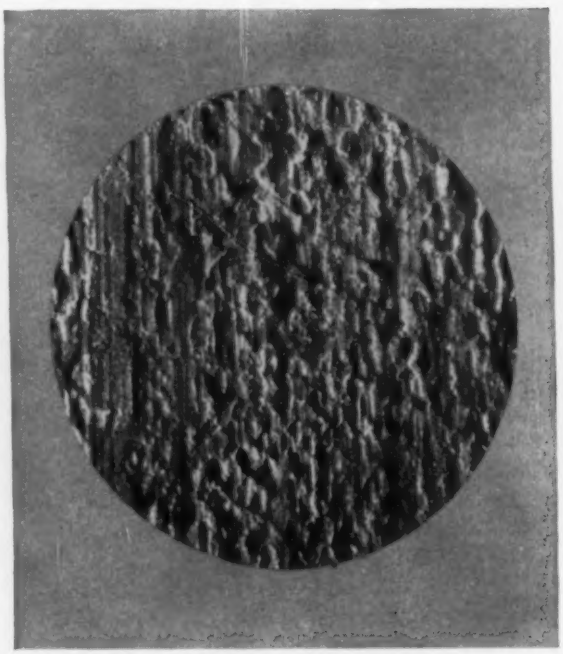
HOW RODINE CUTS PICKLING COSTS

Results demonstrate the effectiveness of Rodine® in retarding the attack of acid on the metal

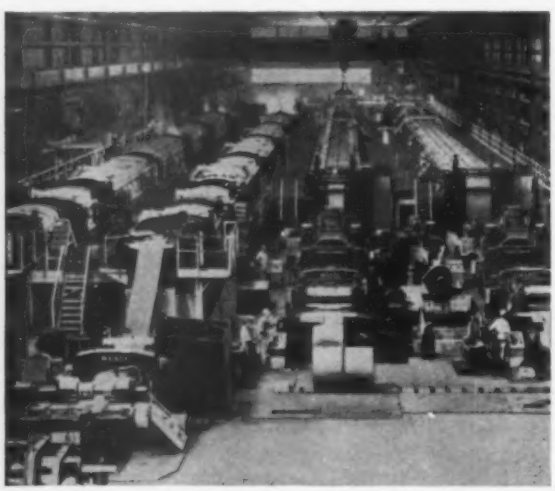
Rodine pickling acid inhibitors, when added in small quantities to acid pickling baths, retard the attack of the acid on the metal without affecting its ability to remove scale. Their effectiveness in saving acid and metal is best demonstrated by this simple comparison.



Effect of Uninhibited Acid on Steel This microphotograph shows a piece of steel which was pickled in an uninhibited acid for 5 hours. Note the deep pits and the crystalline character of the surface of the metal.



Effect of Rodine Inhibited Acid on Steel This steel was pickled exactly like the other piece, but with Rodine added to the acid solution. Only scale pockets and roll marks are visible; no pitting occurred.



A typical strip pickling installation. Rodine prevents over-pickling even during line shutdowns.

In straight line pickling of wire, rod and tubing, Rodine makes available more metal for drawing. In batch pickling, Rodine improves the surface. In continuous strip pickling, Rodine prevents overpickling during line shutdowns. Wherever it is used, Rodine saves acid and metal. Our treatise on pickling and the use of Rodine, "Efficient Pickling with Rodine," gives full information. Write for your copy today.

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CHEMICALS ACP PROCESSES

AERIAL PHOTOGRAPHY: New Industry Tool

Aerial mapping can estimate raw material stockpiles at low cost and fast time . . . Results are amazingly accurate . . . Technique is valuable in determining plant sites, highway routes—By *T. M. Rohan.*

◆ WHEN STEEL MILLS want to check ore stockpiles or turnpike builders want to plan routes, they're up in the air these days. Not that they can't make up their mind. Aerial surveying can be quick, cheap and far more accurate than most ground surveys.

There are at least 30 aerial mapping organizations in the U. S. serving customers ranging from top ranking manufacturing plants, government agencies, power utilities, and mining companies to branch office managers using an air photo to explain their districts to the home office.

Oldtimers in the business like Arnold R. Hull, owner of Aerial Surveys, Inc. of Cleveland, who has been active since 1924, credit wartime aerial reconnaisance for the postwar boom.

"During the war many men in service became acquainted with aerial maps and saw their advantage over conventional drawn maps. After the war they did not shy away from aerial photo maps.

GETTING READY for day's flight, Kucera and photographer James Rubi study maps of area to be photographed.

Took Time

"Before the war aerial photographers in the Pittsburgh area tried for years without success to get mills to take stockpile inventories from the air but were looked on as freaks, not too much removed from the silk-scarf-and-goggles barnstormers. Now through application of known methods to industrial stockpiles, there's a valuable new tool."

Man who finally turned the trick on stockpiles is Robert H. Kucera, head of Kucera and Assoc., Cleveland. In 1950 Kucera convinced American Steel & Wire Div. of U. S. Steel in Cleveland to give it a try on a speculation basis. After several passes, the method proved out and has since spread across the entire industry. Kucera is the largest specialist in stockpile inventories although a far larger part of the work is in area maps for industrial planning purposes. Kucera credits the Kelsh plotter, an extremely precise optical instrument for making contour maps from three dimensional maps, for the accuracy which has made aerial stockpile inventories feasible.

How Accurate?

In recent years routine aerial inventory checks have been made of iron ore, coal, limestone, sand and scrap. Aerial surveyors can hit tonnage in a stockpile within about ½ of one pct compared to previous 3 to 8 pct margin of error — and strengthen company inventory statistics for corporate purposes. Cost is about half that for ground survey purposes. In Canada and South America aerial photos laid the groundwork for Labrador and Venezuelan iron ore developments. In oil producing and uranium areas they are helping uncover new reserves. In most of the U. S. they are helping electric power utilities, pipeline companies and turnpike planners lay out routes without getting landowners excited by "snoopers" and antagonizing them into raising the ante for the property.

AERIAL photography expert Robert Kucera, left, and his chief engineer James Angel plan photo run from Cleveland airport.

Steel producers using the method on stockpiles include U. S. Steel, Bethlehem, Republic, Jones & Laughlin, Youngstown Sheet & Tube, Inland, Weirton and others.

Biggest benefit from the steel

mill standpoint, besides a drastic cost reduction, is that the inventory can be determined at the instant the aerial picture is taken.

Traditionally the estimates of iron ore piles were made by having experienced stockmen walk over the piles and check them with surveying instruments and computations. This took weeks.

Now a plane with aerial camera flies over the stockpile area taking 3-D pictures. Using the Kelsh plotter, the height, width and length of the piles can be computed in the laboratory from the pictures. Multiplying the volume by the weight per cu. yard gives the tonnage of the piles. The plotter will detect 1/10 ft variation in elevation in a stockpile from photographs taken at 1700 ft. From heights of 20,000 ft covering larger areas, the measurements are still so precise that adjustments must be made for the curvature of the earth.

How It's Done

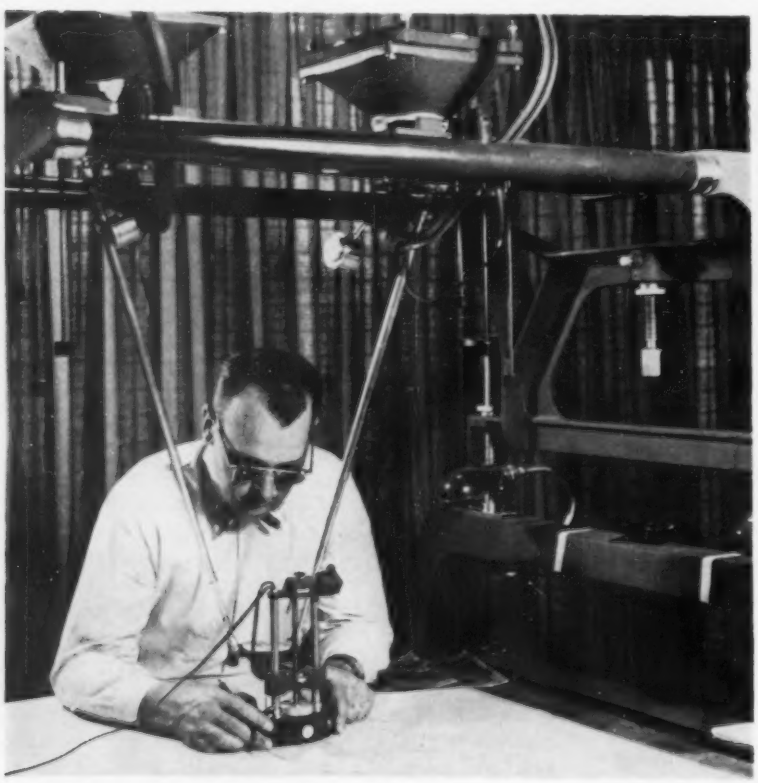
With a Kelsh plotter costing about $7000 a trained technician can draw contour maps of any hill, valley or stockpile from 3-D pictures. The two pictures are projected down onto a small plate which has a bright dot in the center. The technician raises and lowers the plate and can determine the elevation of piles.

Typical cost of a complete inventory of ore, coal and limestone of a mill in the 1 to 3 million ton per year ingot capacity class is about $2000 when a short hop from the airport. It figures roughly to about half of the cost of previous ground survey methods.

One Ohio River Valley steel firm used aerial photos to determine waste disposal areas for its West Virginia coal mine. Topographic maps of the hilly country made it easier to determine where waste could be piled up without jeopardizing future coal reserve areas.

The bulk market for aerial photos and maps from the aerial photographer's standpoint is from construction firms, pipeline and power companies and roadbuilders.

TECHNICIAN uses planimeter to compute breadth of piles at graduated levels to compile volume and weight.



KING SIZE stereoptican with aerial photos projected from above onto small disk permits contour mapping of height and area of piles of stocked material. Machine is the Kelsh plotter, key to good results.

Pipeline and power companies use aerial maps in much the same way to lay out best routes. Changes in elevation are also necessary. Pipeline builders must know them to set grades for the pipes and pumping capacity.

Real estate developers also frequently use aerial maps for large areas to calculate expense of ground leveling and help lay out plots.

New plant construction is probably the top industrial market for the aerial photos. Automotive companies recently made heavy use of them in deciding on locations for the rash of auto plants in Northeastern Ohio. A recent typical job went something like this. The auto firm had bought 200 acres of land for a new plant. Aerial photographers from Cleveland made a complete set of photos plus a contour map. This showed the elevation of the entire area at 2 ft distances, scaled to 2 pct accuracy. From the photos and contour maps, engineers in Detroit who never saw the place, indicated spots for test borings to support heavy equipment, placed their plant exactly.

Nickel:

Metals Expert looks at the situation.

◆ THE SHORTAGE clouds hovering over nickel consuming industries are not likely to blow away. So says Henry D. Lytton, Washington, market consultant and former government metals expert, in his book, "A Basis For Forecasting Nickel Demand In the United States."

Mr. Lytton says that the true condition of the nickel market in 1956 is not indicated by consumption trends, and that predictions of an oversupply in the near future are unrealistic.

The basis of his outlook is the fact that industry adjusted demand and consumption levels to the supply it knew would exist. If the nickel supply was adequate steel production alone would use over 77,000 tons of virgin nickel, with all industry using a total of at least 165,000 tons. Mr. Lytton believes that nickel supply in '56 will total 150,000 tons before government's stockpile "take."

The nickel pie is generally sliced up so that industry gets better than two-thirds of the supply. This year industry's share would average about 102,500 tons. However, Mr. Lytton reports that industry consumption during the first half was at a rate of about 126,000 tons.

Decade Ahead

According to Mr. Lytton's calculations, which suppose enough metal but do not consider new uses, things won't be much better in another decade.

In 1965, the steel industry will use 48,000 tons for the usual alloying, 5000 tons for jet engine type super alloys, 24,250 tons for recapturing markets in which nickel has been displaced, and 12,000 tons to accommodate minimum steel expansion, according to Mr. Lytton. This total of 89,250 tons added to expected demand of 98,500 tons for the non-steel markets, nonferrous alloys, electroplating, cast iron, ceramic, chemical and others, makes a total of 187,750 tons by 1965.

PLANNING

TRANSFORMERS: Size a Problem

Westinghouse lab studies how to beat problems arising from transformer size . . . Noise and radio influence can affect defense systems . . . $3.5 million lab now completed.

◆ AS ELECTRICAL TRANSFORMER size and efficiency go up, so do the problems of transformer noise and radio influence. The noise comes mainly from magnetostriction—expansion and contraction of the core as flux changes. The latter is due to corona or ionization—can affect national defense by interfering with missile control systems.

So when Westinghouse laid $13 million on the line for expansion to keep pace with rising transformer demand at its Sharon, Pa., plant, it also spent another $3.5 million for a special "vault" where engineers will study noise and radio influence problems. Completion of the new facilities was announced this week.

Bigger and Bigger

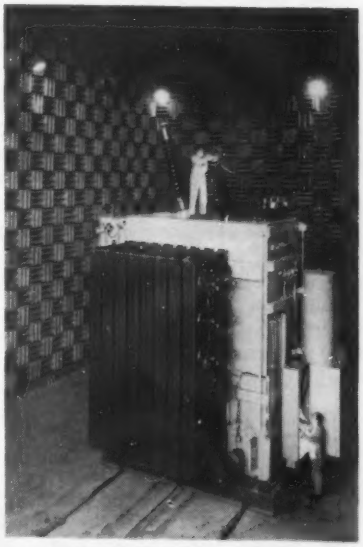
While some transformer noise can be eliminated on the drawing board the problem is growing as units get larger. Hence the new vault, 70 ft long, 55 ft wide and 60 ft high—big enough for a 400-ton transformer rated 500,000 kva. This is about as big as Westinghouse engineers expect to build during the next 10 years.

The vault's inner plywood walls are separated by fiber glass and aluminum foil from its reinforced concrete exterior walls and the whole thing has its own foundation. The vault is made anechoic (without echo) by 3-ft thick fiber glass on walls, door and ceiling.

While they were about it, the designers also shielded the entire vault with galvanized steel sheets, soldered at all joints. Pneumatically operated copper "fingers" seal the door. They even put metal shutters on the observation windows—all to permit radio influence studies.

Radio influence, a term referring to ionization and corona, has come in for more attention recently because of increased transformer capacities, the growth of television and electronic communication and the use of electronic control for guided missiles.

If ionization occurs in the medium surrounding insulation, this ionization, or corona, generates an annoying high-frequency voltage. Though transformers produced for the past 25 years or more have been corona-free, the use of higher voltages demands more research to prevent corona.



ANECHOIC VAULT permits tests on transformers rated over 500,000 kva, weighing more than 400 tons.

Failure to lick this problem in new and larger transformers could wreck anti-aircraft guided missile fire control systems. Or worse yet, enemy missiles could be made to home on a transformer's high frequency signals.

APPLIANCES: A Last Quarter Rally

Disappointments of first half are giving way to last quarter optimism . . . New models are overcoming higher prices, finding consumers buying . . . New records may result from late surge—*By K. W. Bennett.*

◆ MAJOR APPLIANCES are a fourth quarter phenomenon. An industry that appeared to be losing yardage in second quarter has broken loose like a sophomore halfback playing his first Homecoming, appears to be heading for a new annual record in the final minutes of play.

To steel consumers, it means appliance makers (normally consuming about 2-3 pct of finished steel output) will put on unprecedented pressure for cold rolled sheet in fourth quarter. They have averaged 1,800,000 tons of finished steel per year in the past five years, most of it in cold rolled sheet, and are going to be needing more just about the time the automotive industry is hitting its full sheet consumption stride.

The new appliances models are out. They are slightly higher in price but the consumer has already ignored that hurdle and is buying at an unseasonally high pace. Norge, with its inventories of ranges at a historic low, reportedly has established record October sales of home freezers and refrigerators. These historically have been regarded as spring-summer sales items. The same firm expects capacity washer and dryer operations for the remainder of the year.

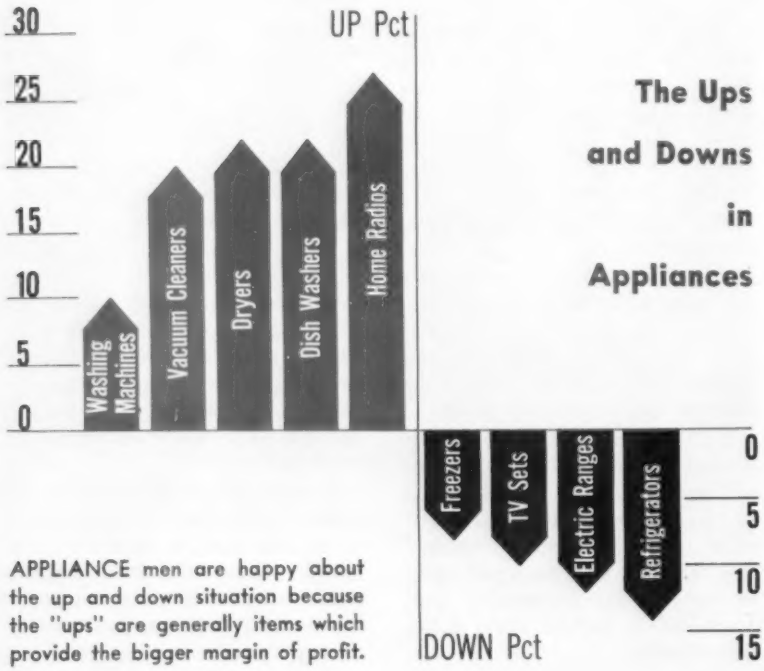
Washers and dryers have nationally hit records (up 10 pct and 22 pct over a year ago by mid-third quarter). Maytag is 18 pct ahead of a year ago and still rising. Hotpoint, Westinghouse, and General Electric haven't said a great deal, but all three of these giants are ahead of year ago sales levels, their dealer inventories are at excellent levels. Figures exceeding 25 pct have been mentioned in connection with various product lines for all three.

Whirlpool-Seeger had this to say: "Increased competition and a reported decline in consumer purchases during the summer were not reflected at the company. We will exceed our own forecasts." Amana, pioneer in the home-freezer field and unique in being a major appliance producer who has concentrated solely in the refrigeration field, is exceeding last year and last year was a record. The firm purchased Deepfreeze this spring, has boosted national advertising, and is growing at a time when most single-product appliance firms have been in trouble.

Future Looks Good

Norge distribution vice president H. P. Bull predicts that washers, dryers, water heaters, ranges, freezers and refrigerators look good for a 41 pct advance in the next four years. Conservatively, this means annual steel comsumption will exceed 3,500,000 net tons. The year 1956, after an extremely poor start, seems to confirm his curve of expansion for the industry, will probably see 2,250,000 tons of steel consumed, besides countless other items.

From dealer to manufacturer, appliance men are predicting a high sales level in fourth quarter, probably the best quarter of the year if the dealers are calling their cards correctly. The upcurve was noticeable in some lines as early as May, but most appliance men watched, held inventories low or reduced them further, and waited. Now, the feeling has become, the time for waiting is past,



APPLIANCE men are happy about the up and down situation because the "ups" are generally items which provide the bigger margin of profit.

and that July marked a major upward turning point.

Norge has added almost a half-million dollars to its advertising budget. Borg-Warner announced a complete household package; home equipment, household appliances, building materials. A Builder Sales Division will offer the packet (all Borg-Warner products) to builders of subdivision sized parcels of new homes. Hotpoint has departmentalized individual appliance and product lines within the original company to boost marketing strength. General Electric is building a system of kingsize dealerships. Maytag has introduced a new low price automatic washer calculated to double the firm's market potential in that price range.

At the end of July, appliance sales were off about 16 pct for eight of the major appliances on a unit sales basis after a bad second quarter. But there were those convinced of the containing strength of the consumer market (IRON AGE, May 24, 1956). Dishwashers, dryers, washing machines, vacuum cleaners were up; refrigerators, ranges, ironers, and freezers were down. At that point, however, the industry began to gain ground. Westinghouse had been throwing off the effects of a five months strike, other manufacturers completed inventory liquidations that brought some sharp price cutting. Prices began to move up.

Last week one of the large appliance manufacturers, though refusing to be quoted, admitted that the current week was 50 pct over the same week one year ago on washer sales. Other laundry equipment and ranges are picking up. At least two more admit that business is better than it has any right to be, but don't want to talk about it. The soft-pedalling is due to persistent reports that the FTC has its boom poised over the appliance industry.

Defy Predictions

At its current rate of pickup, the industry will probably not only wipe out its losses of the earlier part of 1956, mainly in second quarter, but push ahead of the total.

DIEMAKERS: No Sales Peak Yet

Tool and Die Manufacturers are sure 1956 sales will set a new record . . . Predict 1957 volume of shipments to be even bigger . . . Base predictions on first half.

◆ NEXT YEAR looks hot to the nation's tool and die makers. Owners of contract tool and die shops, meeting in Hartford, Conn., for the annual convention of the National Tool and Die Manufacturers Assn., are almost unanimously convinced that next year's sales picture for their industry looks even brighter than that of 1956, which will undoubtedly wind up as the all-time record year to date.

Volume of shipments of special tooling by contract plants in 1956 should be considerably higher than $800 million, NTDMA estimates.

Looks Good Everywhere

While the optimism for 1957 is almost unbridled, most plant owners stress the fact since their backlogs are normally not very large, their predictions could not be projected much beyond the first six or eight months of next year.

Detroit tool and die plants, which have enjoyed an unusually busy year because of major 1957 model changes by the automotive industry, anticipate a 30 pct increase in orders for next year. Orders are already flowing in for retooling for 1958 cars, indicating that the every-other-year or every third year changeover of the automakers is a thing of the past.

Another area strongly affected by the auto industry acceleration is Philadelphia, where some shops expect to be busy with 1958 tooling programs throughout next year. One Philadelphia plant owner said he was "greatly optimistic" and that his force would be busy for at least six months. He added that orders for special tooling were coming into his area from varied industries—radio and television, refrigeration, aviation — and that defense work constituted about 30 pct of the volume. Most plants, he said, are working overtime, averaging 50 hours a week.

More Good Reports

A St. Louis manufacturer of dies and gages reported that many new production plants are springing up in his area, contributing to the already encouraging picture.

New England contract plants also expect 1957 to top 1956. A Bridgeport, Conn., owner explained that one or more major tooling programs now being farmed out will make a big difference. He expects increasing tooling orders in connection with aircraft, missiles, and other government projects to also improve the New England situation.

Full-time Production

In New York City, too, where contract plants serve a wide range of production industries, tool and die executives are looking forward to next year with confidence. One owner said he expects his plant to be very busy, and noted that others with whom he has talked believe they will have "all the business they can handle."

Razorback Register

Standard Register Co., Dayton, O., will construct a new plant at Fayetteville, Ark.

Initial phase of the project, 64,000 sq ft of floor space is scheduled for completion in mid-1957. Marginally punched continuous forms and Zipsets will be turned out at the outset of operations.

Eventually the company plans to expand the plant to 120,000 sq ft, as equipment becomes available, and make it a fully integrated operation.

EXPANSION

FLORIDA: Bids For More Industries

Winter vacationland is getting good response in its campaign to draw new industry . . . Developers see big influx in 1957 . . . Lots of land and water reserves available . . . Sunshine an added bonus.

◆ IT WON'T HAPPEN overnight, but it looks like Florida—haven for tourists, may eventually become Florida—haven for industry. The Sunshine state is making a determined bid for more industry. And the campaign is beginning to bear fruit.

During the first half of 1956, 163 businesses set up shop for the first time in Florida. Over 18,000 new jobs were created, and filled.

Florida still ranks only 27th in the nation industrially. But it has moved up 3 notches since 1950. And during this period manufacturing employment in the state jumped 39 pct, compared to 11 pct for the nation as a whole.

Aluminum Potential

William C. Shelton, supervisor of business research for the Industrial Services Div., Florida Development Commission, expects the 18 months from mid 1956 to be the most gigantic period for establishment of new plants.

Reason: Florida now has a lot of factors essential to many metalworking industries. For instance, with the bulk of the new aluminum producing plants scheduled for construction in the Ohio Valley, aluminum processors and mill products consumers are looking with renewed interest toward a Florida location. An aluminum fabricating center of major potential is springing up in the Miami area. And aircraft companies figure to spend substantial amounts for new plants in Florida.

Pratt & Whitney Div., United Aircraft Corp., will spend $40 million for Florida jet facilities. And Glenn L. Martin Co., has purchased 6400 acres south of Orlando, on which to build.

Aircraft and metalworking companies which are dependent on an abundant and reliable water supply for coolants or for processing find that Florida more than fills the bill. Several members of the staff of the University of Florida made an extensive study of the situation. Professors Black, head of Chemistry Dept., and Eidsness, chemistry teacher, report that no other area of equal size on this continent surpasses Florida in water reserves. They estimate that not counting seawater, obviously available in quantity, industry now uses 25 billion gallons per day, without really scratching the surface.

Another vital factor for major industry is raw or commercial land. Florida, being traditionally a vacation land, is settled primarily on the coast in scenic locations, with plenty of acreage available inland and less picturesque spots on the coast.

Research Lab Sites

The fact that metalworking is taking Florida seriously is well illustrated by the fact that thus far this year 44 metalworking manufacturing or processing firms opened their doors for business in Florida. And 15 companies have set up extensive new industrial engineering laboratories.

The southern divisions of the big companies are lending support to the smaller outfits interested in locating in Florida. Wright A. Parkins, general manager of the Aircraft Div., Pratt & Whitney, reports that 50 pct of the parts his company will require will be purchased from outside companies.

A cross section of new industry already settled or planning to build in the Sunshine state goes from such blue chip concerns as General Electric, Sperry Rand, Minneapolis - Honeywell, National Metals Corp. down to such as Engineered Products Co., with a staff of 5 making Hurriclip shutters.

From Tourists to Technicians

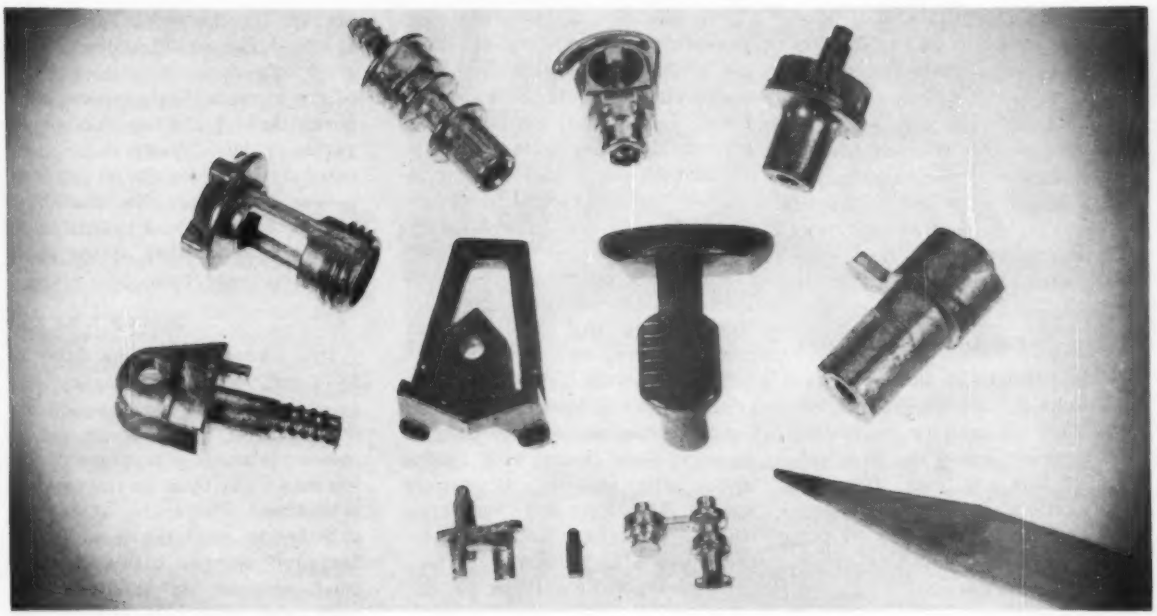
The Florida Development Commission is moving full speed ahead to sell industry on locating in the sunshine state.

Some of the big guns being used in the campaign are:

- **Transportation—Over 7600 miles of railroad track, 275,000 trucks registered in the state, 17 ports of entry, 124 airports for civil air use, extensive and growing system of highways.**
- **Power—Four utilities have spent over $78 million for expansion during 1955, will spend over $208 million during the next several years.**
- **Taxes—No state income tax or state tax on real estate.**
- **Natural Resources—For metalworking, reserves include uranium, rutile and ilmenite (titanium ore), zircon for super alloys.**
- **Labor—Wage scales lower than U. S. average.**

DIECASTING: Big Job for Small Parts

Miniaturization creates big market for small parts . . . Diecasters are a natural for mass production of small, complex shapes . . . New York company shows large savings for many parts—By G. G. Carr.



◆ MINIATURIZATION means more than just making parts smaller. A miniaturized part must do at least the same job in less space than its bigger counter part.

Diecasters today are stressing that their process can be tailor-made for mass production of complex shapes in small sizes. They cite case histories of impressive savings on a variety of highly complex parts, even in competition with captive facilities for other forming methods.

Growing Business

At Gries Reproducer Corp., New Rochelle, N. Y., engineers point to such savings as 66 pct on a rear view mirror component formerly machined from brass bar stock; a rifle automatic safety catch formerly a 14¢ 3-piece assembly now diecast in one piece for 2¢.

Gries is a leader in the business of making big things smaller and small things more efficient by diecasting. Specializing in miniature zinc and thermoplastic diecastings, the New Rochelle company currently turns out over 1 billion such parts a year. Heaviest part it makes weighs only ½ oz, the smallest (to date) runs 275,000 pieces to the pound. Products range from umbrella tips and swivel rings to intricate gears and industrial fasteners. A typical day's output might include wing nuts and thumb screws, binder rings, gears and pinions, valve stems, jewelry findings, guide plugs for computers and flywheels. (See illustration.)

Parts are designed for fast production on special automatic diecasting machines. Molten zinc or plastic powder (plus inserts if needed) is fed to dies automatically, and cast parts are degated, trimmed and ejected in cycle. Only burnishing and plating must be taken care of off the machines.

Production rates for the tiny parts may go over 350 pieces per minute with runs from 100,000 to millions of pieces. Gries officials report that real money savings start to show up around 500,000 parts, keep going up thereafter.

Something New

The company also offers an unusual complementary service in its patented "Intercast" process by which complete movable-parts assemblies are produced in one automatic operation. Parts now being Intercast include picture frame swivel rings, miniature scissors and pliers, looseleaf binder rings chains and furniture drawer pulls. Savings through elimination of assembly operations alone can be impressive: the one-operation drawer pull replaces an assembly of two screw machine parts plus a metal stamping.

EXECUTIVE PAY: They Like It Deferred

Thirty pct of steel firms covered in survey indicate they use some form of deferred compensation . . . Percentage is above the general average . . . Stock options favored by 3 out of 4 steel firms.

◆ THERE'S IMPORTANT USE of various forms of deferred compensation for the key executives of steel companies.

Some type of compensation—other than salary and bonuses—for top personnel was reported by 30 pct of the steel firms represented in an annual executive compensation survey made by McKinsey & Co., management consultants.

Below Heaviest Users

"This percentage of participation," John S. Crowley reports, "is above that of industry generally, but somewhat below the heaviest users of this additional form of compensation. The retail industry —for example—had nearly 50 pct of its reporting companies using deferred compensation.

"In addition to deferred compensation," he adds, "about three out of four of the steel companies surveyed made use of stock options. In this they rank near the top of 18 major industries surveyed with about half of all companies reporting indicating options were in effect for some executives."

According to the survey, compensation of the chief operating executive in the steel industry compared very well with those in comparable jobs in other industries. Steel fell below average for the 18 industries studied only in cases of steel firms with profits under $10 million. It ranked among the top five industries when considering companies with sales over $100 million.

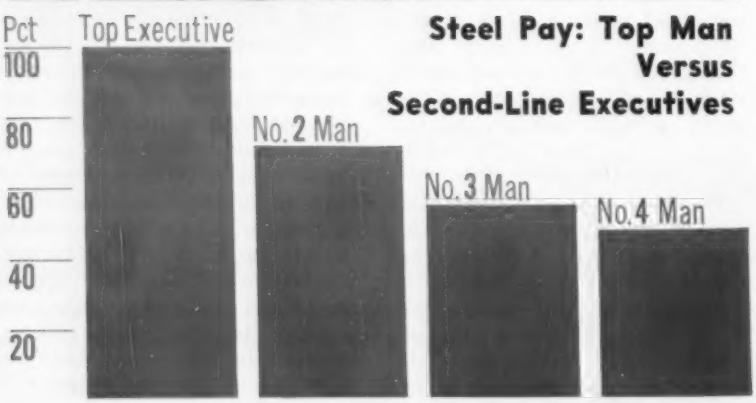
However, while average pay increases for the second, third and fourth highest-paid executives in steel companies paralleled those of the top man, their income, as a percentage of the top man's pay, varied widely. There is an indicated tendency for the larger companies to pay the No. 2 and, in some cases the No. 3 executive, at a rate close to that of the chief operating executive.

Second Line Pay

But companies in the $100 to $300 million sales category pay third and fourth highest-paid executives, on an average, at a somewhat lower percentage of the top man's pay than do the smaller companies. There are, of course, substantial variations to these "average" figures, with variations most extreme in medium-sized companies.

Steel companies' average percent increase in sales and profits for 1955 were highest of the 18 industries included in the survey and its average percent increase in top executive compensation ranked among the leaders. Steel is high on the list in building incentives into its executive compensation. Consequently a high proportion of the 1955 increases were the result of some form of bonus tied to sales and/or profit.

There were substantial variations among steel firms reporting executive compensation, sales and profit for '55. While only one company listed lower sales and one other lower profits, top compensation charges ranged from one decline of 11 pct to one increase of more than double that of the previous year. Overall, compensation increases for '55 outnumbered declines by better than 4 to 1, with only three companies reporting the same for top executives.



Steel Pay: Top Man Versus Second-Line Executives

STANDARDIZATION: Cost Cutting Aid

Greater use of in-plant standards often has an important cash register value . . . Raytheon saves $250 thousand a year by reducing assemblies stocked . . . Standardization's a sales ally, too—By G. G. Carr.

◆ IF YOU REALLY want to cut costs and boost profit margins, in-plant standardization can be a golden opportunity. Impressive testimony to the cash value of standards came from all branches of manufacturing at the American Standards Assn. meeting in New York.

And the case histories show that standards can pay off equally well on both big and little items. Raytheon Manufacturing Co. is saving a quarter of a million dollars every year by paring the 24,000 varieties of threaded assembly hardware previously stocked down to 315 types.

Tooling Costs Paid

Raytheon was shocked to find that it had 450 special types of control knobs, plus the regularly available models. Temporary tooling for these special knobs alone had cost $45,000. Standardization after 18 months on a family of knobs with five sizes and six styles save $83,000 on in-plant costs through lower piece prices and elimination of special designs and tooling. Production tooling for the standard line costing over $100,000 was amortized during the same period. And sales of the line to other companies brought in $35,000 profit.

David E. Pierce, director of manufacturing control, Diamond Alkali Co., stresses the value of standardization through experimentation. He cites one application where literally thousands of a special, homemade flanged valve had been used by his company for many years. Since face-to-face dimension of the Diamond valve was identical with the national standard, several commercial types of valve were easily tested without expensive changes in piping. A commercial valve has proven satisfactory at substantially lower cost. In the 4-in. size, the commercial valve costs $66, against $224 for the homemade.

STANDARDIZATION experts tell how to get the best results at recent National Conference on Standards. Left to right, they are: Joseph Gurski, assistant manager, Manufacturing Research Dept., Ford Motor Co.; W. R. Miller, chief metallurgical engineer, American Steel & Wire Div. of U. S. Steel Corp.; M. L. Mochel, manager, metallurgical engineering, Westinghouse Electric Corp.; D. H. Ruhnke, chief metallurgist, Republic Steel Corp., and J. Robert Walgren, chairman, ASA company member conference, standards engineer, Aluminum Co. of America.

Fairchild Instrument & Camera Corp. was distressed to find it paid $4,780 in two months to update material, finish and process specs on 1192 drawings. Annual expenses for similar changes were estimated at $19,120. Fairchild now has its own in-company spec numbering system which eliminates government, military and commercial specs from drawings. Costs of installation for the new system were $2000; savings for the first year of full application are estimated at $16,320.

Joseph Gurski, assistant manager, manufacturing research department, Ford Motor Co., offers this basic principle for product engineering:

"Allow manufacturing all possible freedom in selecting materials and processes consistent with production of parts that satisfy end product requirements."

Mr. Gurski offers examples of substantial savings at Ford through adherence to this principle. Among them is a saving by Ford of $8500 through switching, with a slight calculated risk, from special bar quality to merchant bar quality for a frame reinforcing plate.

Piston pins gave Ford opportunities for even more impressive economies. Raw material size was so close to finished diameter that "piston pin quality" was specified. After review, the company dropped that requirement, specified magnetic testing and boosted ordering size 0.010 in. Taking the slight calculated risk that any surface imperfection will be machined off, the company saves $50,400 annually.

ENAMELING: Gains Ground In New Fields

Vitreous enameled products industry has been running into stiff competition in some conventional lines . . . But market and product research is an offsetting factor . . . 1956 will see record shipments.

◆ FORCED FROM the pantry shelf by aluminum and stainless steel cookware, the vitreous enameling industry is developing a huge new market in the field of architectural paneling.

This market, together with increased demand for porcelainized hot water tank liners, is revitalizing an industry that suffered a serious setback in 1954. For the immediate future, the picture looks bright.

Captive Trend

With big appliances makers doing more of their own porcelainizing, the trend in the industry is toward more captive plants and fewer independent companies. However, the 50-odd independent companies now operating are getting their share of a revived market that is approaching the $500 million mark in annual shipments.

They get most of their orders for such things as home appliance parts, architectural items, plumbing fixtures, and tank liners —plus utensil work. The Census of Manufactures shows the industry shipped $76.3 million worth of products in 1947. In 1954, shipments dropped to $66.2 million.

Fortunately, demand for hot water tank liners and architecturals came from behind to bolster the sagging sales curve and in 1955 the industry regained lost ground. This year, shipments by independents are expected to reach $80.1 million.

During the period 1947-54, which saw a number of independents absorbed by large appliance makers, companies increased from 47 to 50. But in the same period, number of workers dropped from 11,600 to 7,200.

Color Plus Durability

While metallurgy is changing the picture in housewives' cooking habits, porcelain enamel research is altering the artistic preferences of architects and the design preferences of heating engineers.

Porcelainized metal curtain-wall panels used in exterior building construction are easy to fabricate, they are durable and put all the colors of the rainbow at the architect's disposal. Compared to the $5 million in architectural items shipped by the industry in 1947, the total this year will probably hit $60 million.

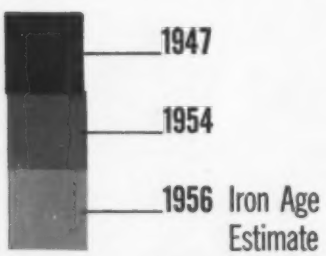
Small appliance makers are going in for colored porcelain enameling. At least two major manufacturers are coming out with colored porcelainized toasters.

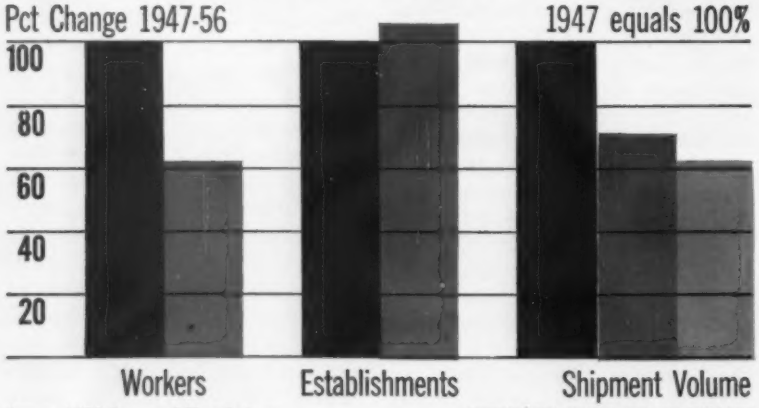
Hot water tank producers now are turning out 70 pct of their tanks with "glass," or porcelainized, liners. Durability is the advantage here.

Major technical advances made by the industry since 1947 include low temperature firing, thinner coatings, new base metals, better chemical resistance.

The industry is now able to porcelainize materials at 1350°F or less—thus opening new markets for materials, such as aluminum, which buckles under high-temperature firing.

How It Looks for Enamelers





Source: 1954 Census of Manufactures

SHIPMENTS BASED ON '47 DOLLARS

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Weirzin's tightly bonded zinc coating takes the deepest draws with ease—does not crack, peel or flake under the severest fabricating operations.

Weirzin's malleable zinc coating lubricates dies without leaving a zinc deposit—reduces die maintenance—increases die life.

Weirzin, chemically treated, takes and holds paint, enamel, lacquer and lithographic ink indefinitely—eliminates underfilm corrosion.

Weirzin stops inventory losses due to rust—eliminates pickling—reduces cleaning and buffing—cuts handling before, during and after fabrication.

How to wrap up product superiority...at lower cost

Weirzin

electrolytic zinc-coated sheet

No matter how extreme the stresses of fabricating operations, electrolytic zinc-coated Weirzin stands up under them. Its tightly bonded malleable coating flows so smoothly with the ductile steel base during a deep draw that Weirzin seldom needs additional coating for corrosion protection.

Here is a different kind of steel sheet. For ease of fabricating, for durability, for long-range economy, no other "similar" metal measures up to Weirzin. Weirzin is produced in a continuous strip up to 36" wide. It is available in coils or cut lengths down to ½" strip—gauges .010 to .0478. Phone or write now for the money-saving, customer-pleasing facts about Weirzin!

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

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NATIONAL STEEL CORPORATION

EXPANSION IN INDUSTRY

More for J & L:

Moreell forecasts added expansion.

Outlook for steel operations is so good Jones & Laughlin Steel Corp. has decided to increase its steel expansion program in addition to announced plans.

The new intent of J & L to add to its cost reduction and expansion program was disclosed by Adm. Ben Moreell, chairman, with the company's third quarter financial statement.

The chairman of the nation's fourth largest steel producer referred to the company's 106 pct operating rate, said the outlook is so encouraging the company has decided to increase its program.

It is generally believed that J & L will enter the stainless steel field. The company last April indicated its intention to go into production of stainless.

Adm. Moreell gave no estimate of cost or scope of added expansion plans, but did indicate that increased costs of materials and services had made necessary an increase in appropriations it has already made for expansion and modernization of facilities at Aliquippa, Pa., and Cleveland.

Pacific May Expand

Pacific States Steel Corp., Niles, Calif., is seriously thinking about putting in a blast furnace.

The company, interested in this for some time, has a present capacity of 181,770 ingot tons. If and when the firm does go integrated, it will rely for ore on western sources, and set up its own coking operation.

There are rumors that Pacific States Steel is considering installation of a 450-ton blast furnace, although the reports are unconfirmed.

Modern Design for Tube Mill

WHEN a combination of aluminum, glass and concrete is hung on this skeleton it will be a new Superior Tube Co. plant in Wapakoneta, Ohio. It will be the first in the area to feature tilt-up concrete panels—poured flat and lifted into place when set. Completion expected Nov. 15.

Clevite Doubles

Clevite Corp., plans to double the rubber compounding capacity at its Clevite Harris Products plant in Milan, O. Key item in the program will be installation of a second Banbury mixer—a three-story-high machine in which a wide range of rubber formulas can be compounded.

Much of the new plant's production will go to the company's Napoleon, O., plant where rubber and metal parts are assembled. Completion is scheduled for next summer.

New Zircon Furnace

Allegheny Ludlum Steel Corp. announced plans for construction of a second furnace for melting high-purity zirconium at its Watervliet, N. Y., plant.

The new furnace will have even greater capacity than the 50,000 lb per month rating of the furnace just completed. Completion is expected by the end of this year. The company's rated capacity for production of zirconium ingots will then stand at 125,000 lb per month. It will supply the atomic energy industry.

Expansion Briefs

Detroit Broach & Machine Co., Rochester, Mich.; 15,000 sq ft addition to its present plant, will be used entirely for production.

General Machine Products Co., Bensalem, Pa.; 60,000 sq ft plant, for making special machinery for electrical, electronic, and communication industries and precision industrial components.

Titanium Metals Corp. of America, New York; purchased the Louis Berkman Co. steel mill at Toronto, O., will convert it to titanium rolling and forging mill.

ANOTHER NEW DEVELOPMENT IN PACKING DESIGN

PRE-FORMED SHOULDER AND FLARE MAKE CUP PACKINGS FIT BETTER

Houghton's newly designed leather cup packings are pre-formed. They *fit* the square corner normally found between the end of the piston and the cylinder wall.

As a result, there is no distortion of the packings under operating pressure. They are not forced into a *new* shape which would cause premature wear, fracture or breakdown at the heel. In addition, the side walls are molded with a slight flare which provides sufficient pre-loading for perfect sealing at minimum pressures.

This leadership in hydraulic know-how is typical of Houghton, who makes all types of hydraulic and pneumatic packings, as well as a complete line of hydraulic oils and fluids.

Standardize on Houghton. You'll get the newest first—and the best always. Call your Houghton Man and let him explain Houghton's Hydraulic Service. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

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Ready to give you on-the-job service . . .

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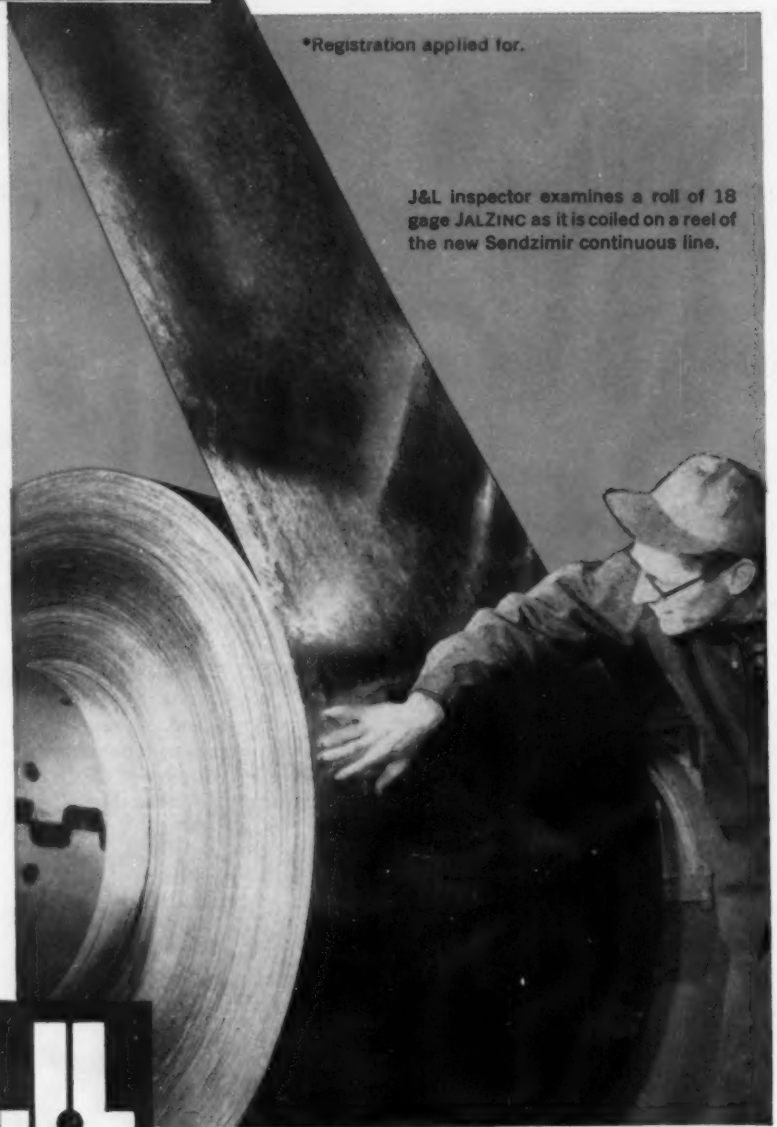

J&L inspector examines a roll of 18 gage JALZINC as it is coiled on a reel of the new Sendzimir continuous line.

JALZINC is Jones & Laughlin's new trade name for its *high quality* zinc coated steel sheet and coiled product. JALZINC answers your toughest forming, rolling and drawing problems.

Produced by the proven Sendzimir process, JALZINC has a tight, uniform coating that resists cracking and flaking. The high lustre finish greatly improves the appearance of your end product. JALZINC is available in a wide range of gages and widths in both cut lengths and coils.

Users are enthusiastic about JALZINC'S uniform ductility, flatness and surface finish. Write today for complete details.

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REPORT TO MANAGEMENT

Tiger by the Tail

There isn't much doubt, even at this early date, that the current high level of business will continue, even gain, through most of next year.

The question that arises is whether this climbing level of dollar volume will be translated into real earnings or will be absorbed by a devaluated dollar. In plain language, how much of the dollar volume will be attributed to inflation?

The effects of inflation are becoming a matter of increasing concern, as prices continue to mount. The annual survey of leading economists by the F. W. Dodge Corp., for example, indicated that 1957 will be the "best" business year in history.

But these economists believe that inflation will account for much of the increase in dollar volume. In fact, it is concluded that the new records "will be primarily the result of shrinkage in the purchasing power of the dollar, rather than a real increase in output."

The economists believe that the consumer and wholesale price indexes will continue to rise, that the increase in prices will be the result of recent and future wage increases in industry.

What's To Be Done?

Business and the government both share the uneasy feeling of this situation. There is little comfort in record sales if they can not be translated into real profits.

As a businessman, your best bet is to be prepared for rising costs of materials, do your best to avoid contributing to inflationary trends. But don't get committed to a firm future pricing policy when you know your own costs are also going to climb.

The tight money policies of the government were also attacked by the surveyed economists, some of whom felt that tight money policies had gone far enough, or perhaps too far.

How the FRB Sees It

The Federal Reserve Board, at least in the prevailing opinion, still believes that its policy of increasing the cost of borrowing money is the best way to combat the threat of inflation. (Even though it has had little effect to date.)

As Vice Chairman Balderston puts it: "If the supply of credit becomes excessive in relation to the goods and services available, prices tend to rise; if the converse is true prices tend to fall. . . . Hence, the supervision of government is needed over the total supply of money and credit."

What the "Fed" may have neglected is the growing conviction in business that to stand still is more dangerous than high interest rates, particularly in view of opinion that prices and other costs are going higher. This may be behind the apparent failure of the policies to curb borrowing as much as intended—or hoped for.

Beware of Second Half Blues

Going back to the Dodge survey, a strong trend on the part of economists to be bearish about the second half was observed. Recent history just doesn't back this up.

In most recent years, the Federal Reserve Board's index of industrial production was higher in the second half than in the first. The year 1953 showed the only significant decline.

The fact's don't justify a second half rule of thumb slump. Auto production, steel production and many other major industries now put on the pressure in the September-January period.

INDUSTRIAL BRIEFS

Bigger Fanfare . . . The Trane Co., La Crosse, Wis., has added a high capacity heating and ventilating unit for large area conditioning. The unit, called "Torrivent," is designed for industrial, commercial and institutional buildings and can be used both for comfort and industrial process applications.

Catcracker Contract . . . The Fluor Corp., Ltd., Los Angeles has been awarded a contract to engineer and construct a catalytic desulfurication unit for Great Northern Oil Co. at its Pine Bend, Minn. refinery. Total cost of the project is approximately $1 million and is scheduled for completion in December 1956.

Plunging Ahead . . . A Three-acre manufacturing plant and home office for Minneapolis-Honeywell Regulator Co.'s Valve Div. will be constructed at Fort Washington, Pa. The building, representing an investment of more than $1.5 million, will house the entire manufacturing, sales, research, development and administrative facilities of the division, now located in Philadelphia.

Trial Runs . . . Lindberg Engineering Co. has a special new line of furnaces designed for pilot plant operations requiring testing and determining proper methods and processes for heat treating and melting of metals. The furnaces will be made available to industry through the Pilot Plant Equipment Division.

Smooth Operator . . . General Electric Co., Schenectady, N. Y., has opened its $1 million bearing and lubricant center, computed to be one of the largest test and development facilities of its kind in American industry.

Teaching Toil With Soil . . . Anticipating an acute shortage of experienced construction equipment operators when the new U. S. highway program is under way, Greer Technical Institute has taken steps to alleviate this situation by opening an earthmoving school in Braidwood, Ill.

Hacienda Highball . . . As part of a modernization program, the National Railways of Mexico has purchased ten diesel-electric locomotives for mainline passenger and freight service from General Electric at a cost of $1,943,590.

Wedgelock Wedlock . . . Three divisions of Wedgelock Co., manufacturers of aircraft sheet metal fasteners and aircraft tools, have been consolidated into one corporation to be known as Wedgelock Corp. It includes Wedco Screw Products Co., Finkle Realty Co., and the original Wedgelock Co., North Hollywood, Calif.

German Splash Party . . . The Babcock & Wilcox Co., New York, has contracted to design and engineer a nuclear research reactor for Kernenergie Hamburg, Society for the Utilization of Energy in Shipbuilding and Navigation, Inc., Hamburg, Germany. The Society proposed to negotiate a separate contract with B&W later this year covering reactor manufacture and construction. The unit will be of the "swimming pool" type designated to provide cooling, neutron moderation and some reflection and shielding.

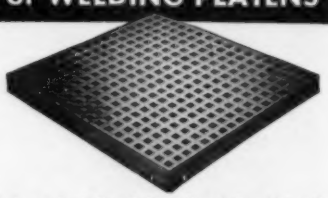
Red-Hot Requiem . . . Construction of a 500-ft tunnel at the Hanford plant for disposal of equipment too radioactively "hot" to be repaired and too heavy to be hauled away for burial has solved an atomic problem for General Electric Company engineers.

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

BENDING BLOCKS or WELDING PLATENS



4 ft x 4 ft—5 ft x 5 ft—5 ft x 6 ft. Also other sizes. Cast steel blocks for layout, welding & assembly. Tools, stands & accessories. Write today for information.

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DUO-FLEX
Powerful 1000 ft. beam plus flexible extension probe light for hard-to-reach dark spots. Uses 2 standard size batteries. Thousands of new industrial uses. Write for details, prices today.

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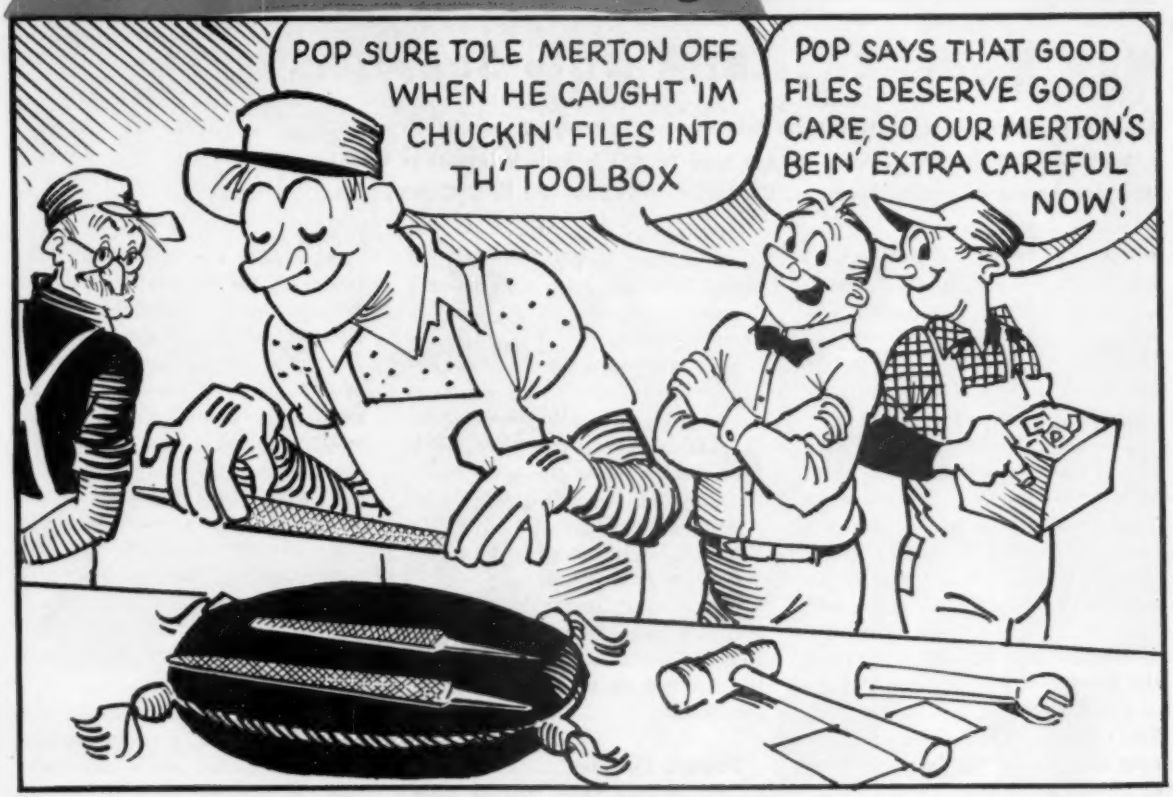
U. S. ELECTRIC MFG. CORP.
222 W. 14th St., New York 11, N.Y.

POP'S school of Filing


POP SURE TOLE MERTON OFF WHEN HE CAUGHT 'IM CHUCKIN' FILES INTO TH' TOOLBOX
POP SAYS THAT GOOD FILES DESERVE GOOD CARE, SO OUR MERTON'S BEIN' EXTRA CAREFUL NOW!

Nicholson and Black Diamond files are fine hand tools from a manufacturer who specializes in files and files alone. In steels made to exacting specifications, in blanks checked for exact conformity to a master blank, in precisely cut teeth that are given an extra-keen edge by sandblasting—in dozens of painstaking manufacturing steps and unremitting quality controls, you are assured that there are no finer files than those made by Nicholson.

An X.F. (*Extra Fine*) Swiss Pattern file is shown here. It is one of hundreds of Swiss Pattern types and sizes. In addition there are literally thousands of cuts, sizes and shapes of Regular and Special Purpose Nicholson and Black Diamond files. These fine tools needn't be treated with the exaggerated care shown by Merton in the cartoon. But they'll cut faster and last longer if you keep them clean and in a file rack. As Pop says, good files deserve good care.

NICHOLSON U.S.A.

NICHOLSON FILE COMPANY, PROVIDENCE, RHODE ISLAND

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)

BLACK DIAMOND U.S.A.

NICHOLSON and BLACK DIAMOND FILES

A FILE FOR EVERY PURPOSE

New Model Bugs Bite Auto Suppliers

Steel and other basic materials orders are off in Detroit due to production problems . . . Auto output was 20 pct behind schedule in October but industry hopes to make it up . . . Optimism prevails—By T. L. Carry.

◆ AUTOMAKERS GENERALLY are having a tough time getting off the ground on new model production—a major reason why the industry hasn't been exerting as much pressure on steel mills as some people expected.

You might think that 1957 cars don't look much different than 1956 models, but the fact remains that this is one of the biggest hangeover years in history. Bugs in production are popping up at a more rapid rate than usual.

Targets Are Missed . . . Take the Ford Div. for example. There is a new frame on the 1957 model. The company has had—and probably still is having—a great deal of difficulty in producing frames.

Many frames had to be scrapped and, in order to make up for lost time, Ford has been shipping frames by air to its various assembly plants.

A luxury car maker is also having its difficulties. Jigs and fixtures have had to be modified to the extent where the extra work has bogged down the production targets that were first set.

Another member of the Big Three is having trouble with late deliveries from vendors.

The overall result is that the industry produced approximately 100,000 cars less in October than the 511,000 that were originally scheduled.

Outlook For Steel . . . Some producers believe they will be able to make up lost production in November. But the wish may be the father of the thought. Total production in November has been tentatively set at about 650,000 units. This is near the full amount of cars that can be made. So, although the industry may be able to pick up some lost production, it isn't likely to pick up all.

This is where the demand for steel is going to come in strongly.

Up to this point, the industry hasn't been too eager to buy steel. Automakers in the main have taken all the steel that was alloted to them and let the market pretty much alone.

There are many reasons for this. Inventories, even during and after the strike, were unusually high. In addition, 1956 production was cut back sharply toward the end of the model year in order to reduce dealer stocks.

The industry learned a bitter lesson in 1955 regarding public attitude toward new models and it is cautious regarding the outlook for 1957.

Therefore, automakers went into 1957 production with a good supply of steel and they haven't been using as much as they ordinarily would.

Suppliers of other basic materials and parts—especially brass and copper mills—are hurting because automotive orders are lagging. But attempts to make up some of the lost production in November and December are going to open up the flood gates as far as demand is concerned.

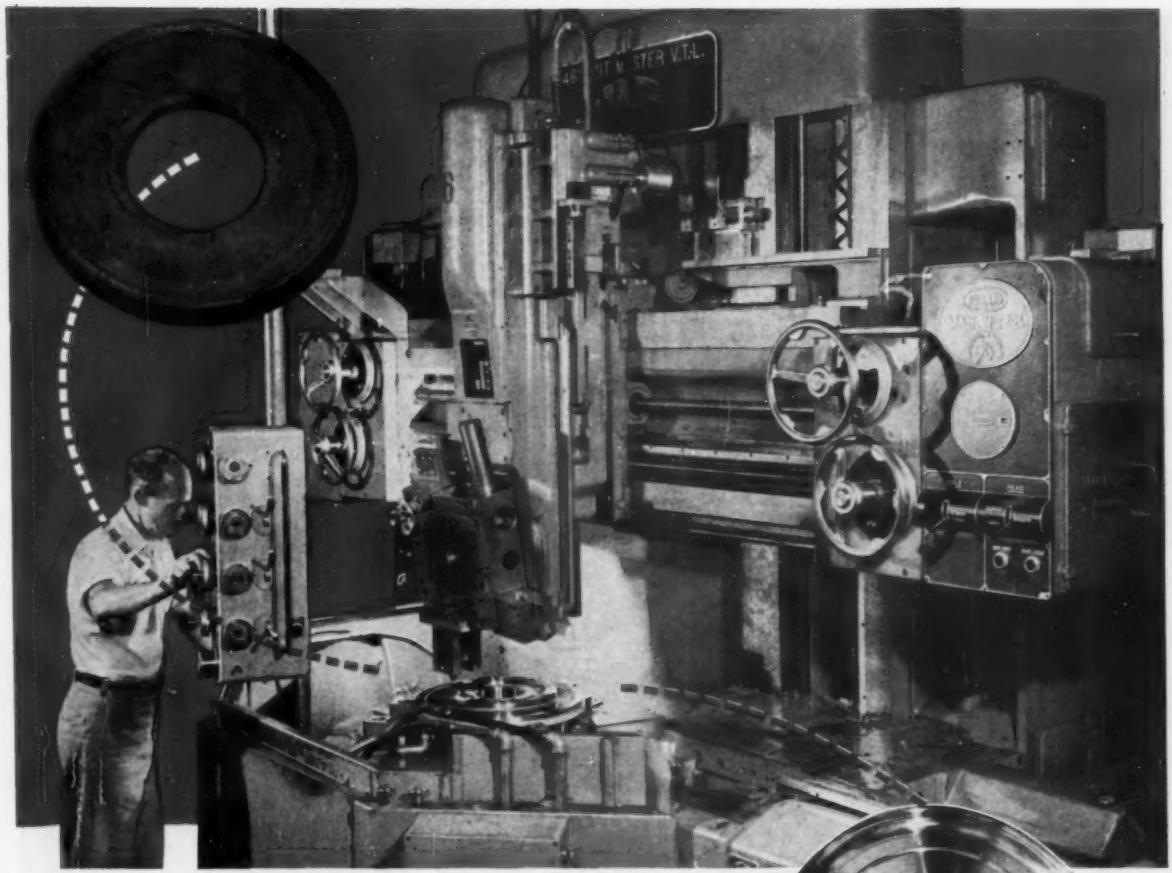
There is one more fact that cannot be overlooked. There is a

How Ford Prices Compare With Chevrolet

When Ford first announced its 1957 prices, a lot of eyebrows were raised because the increase over 1956 was so moderate. Under a new schedule, here is how Ford prices stack up to Chevrolet now:

- **Ford's Custom series was dropped to an average of $1 less than Chevrolet's 150 series.**
- **Ford's Custom 300 series, $10 to $11 less than Chevrolet's 210 series.**
- **Fairlane series, $1 less to $2 more than Chevrolet's top line Bel Air.**
- **Fairlane 500, Ford's top line, $42 to $45 higher than Chevrolet's Bel Air.**

Apparently, Chevrolet's sales generals regard Ford's $1 price advantage as something less than a deadly weapon. The GM division believes it is unlikely a dollar will swing a deal one way or the other.



"To produce quality parts in quantity . . .

Nothing beats Man·Au·Trol"

This statement by Mr. W. Mason Williams, Manufacturing Manager of the Jet Division, Thompson Products Inc., Cleveland, Ohio, is based on ten years of experience with Man-Au-Trol.

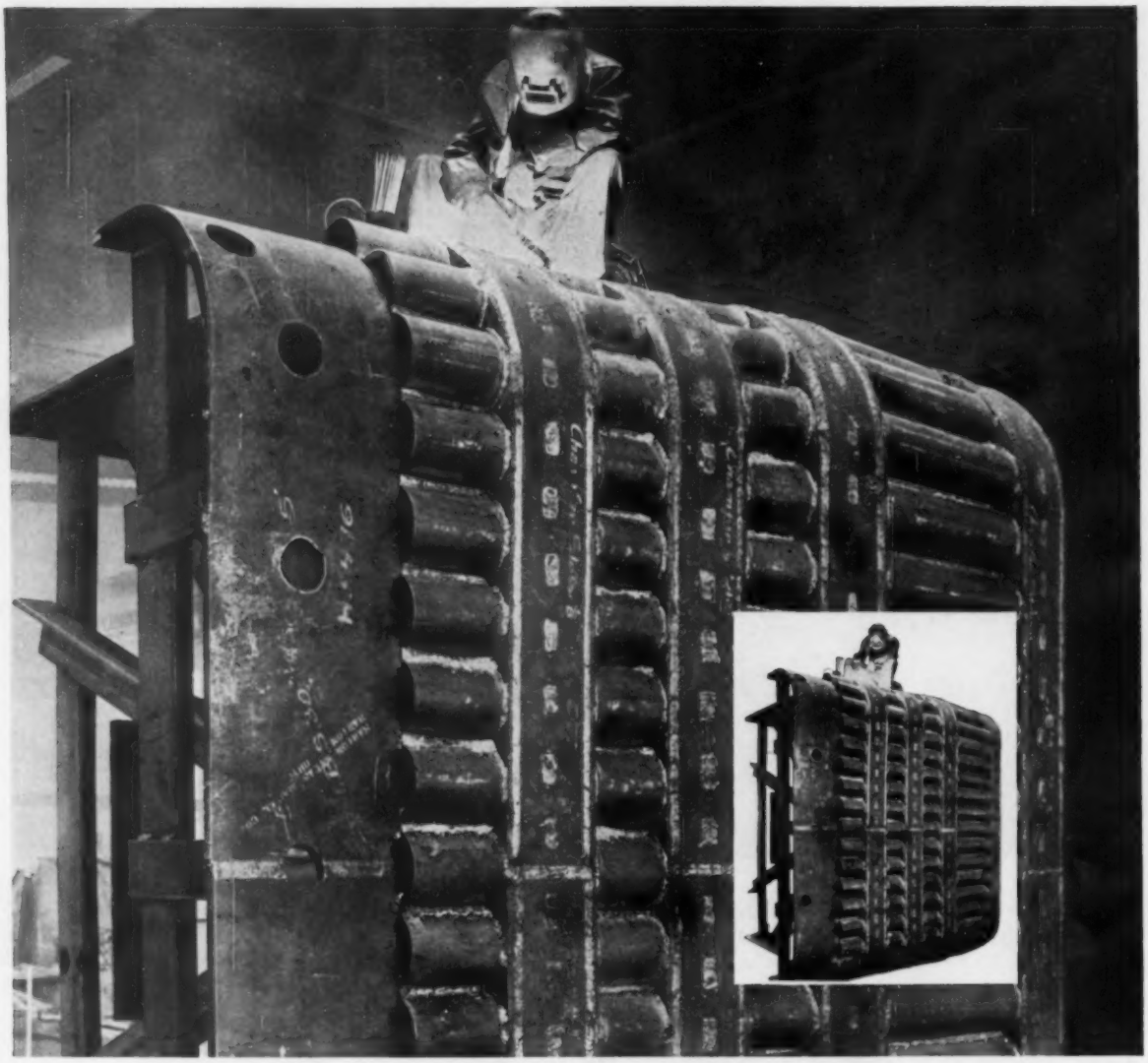
"If it hadn't been for Man-Au-Trol" Mr. Williams continues, "we would still be turning out aircraft engine components on manually-operated machines. Man-Au-Trol, particularly when tooled with better cutting tools, has enabled us to turn out at least *five times as many compressor disc and turbine discs per shift* as we produced on hand-operated equipment."

BULLARD

You, too, can apply to your machining problems the many advantages offered by Man-Au-Trol, Model 75 — just call your nearest Bullard Sales Office, Distributor or write for catalog to

THE BULLARD COMPANY

BRIDGEPORT 9, CONNECTICUT



Another huge dipper for a Marion type 5561 stripping shovel—made entirely of Lukens "T-1" steel for extra strength, impact and abrasion resistance—in the shops of Marion Power Shovel Company, Marion, Ohio.

Fabricator of power shovels says:

"LIKE THE WAY TOUGH LUKENS 'T-1' STEEL WELDS AND HANDLES IN THE SHOP"

■ Marion Power Shovel Company's 45 cubic yard stripping shovels now deliver greater payloads with lower maintenance costs and longer service life at the strip mines. Sixty tons of Lukens "T-1" steel in the dipper stick, bail, door, and the dipper itself do the work that once took many extra tons of ordinary steels. And Marion has experienced "no unusual welding problems since switching to this extremely high yield strength metal . . . very satisfied with the way it handles in the shop."

Lukens "T-1" steel is available in the widest range of plate sizes anywhere. Figure it in your new plans.

Our 24-page illustrated booklet, LUKENS "T-1" STEEL, will help show you the way. Write to Manager, Marketing Service, Lukens Steel Company, 847 Lukens Building, Coatesville, Pennsylvania.

Do it now!

LUKENS "T-1" TRADE MARK STEEL

LUKENS

THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS
LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
OCT. 27, 1956	114,946	22,966
OCT. 20, 1956	94,326	23,604
OCT. 29, 1955	163,532	24,751
OCT. 22, 1955	142,137	27,059
TO DATE 1956	4,860,401	999,249
TO DATE 1955	6,805,997	1,094,925

*Estimated. Source: *Ward's Reports*

growing feeling in Detroit that the new cars are going to sell a lot better than anybody has dared to hope. If this is the case, the first quarter in 1957 is going to be one of the strongest on record for steel mills.

Prices:

Ford revises them; seeks promotional advantage.

Ford Motor Co. obviously had its tongue in cheek when announcing price revisions for its 1957 line of Ford cars. The company cut the price on five models but increased the suggested list on 13 others. The net result is almost the same.

Underlying reason for the price revisions is obvious. The new price scale puts Ford on a more equal basis, and in some cases $1 under, comparable prices for its number one competitor, Chevrolet.

As of this writing, Ford can technically claim that it has the lowest price station wagon and passenger car in its field.

The price revisions brought many a knowing smile to executives at Chevrolet headquarters. Ever since Ford's original price announcement in September, it has been quietly rumored that there would be upward revisions.

Chevrolet executives openly expressed amazement at the Ford suggested prices. "How," they asked, "can you spend $209 million for tooling, in addition to paying more for raw materials and still raise prices so little?"

The answer is that Ford has made the painful discovery that such a maneuver is impossible. For the company has raised more prices than it lowered.

Briefly, here's how Ford's new prices now stack up with Chevrolet's:

When Ford's 1957 prices were first announced, the Custom series was generally $5 higher than the Chevrolet 150 series. Under Ford's new setup, the price was dropped to an average of $1 under Chevrolet.

In the Custom 300 line, Ford's first prices averaged $39 less than the Chevrolet 210 series. Now, the Custom 300 is $10 to $11 less than the 210.

Last September, Ford's Fairlane was $50 less than the top of Chevrolet's line, the Bel Air. Presently, the new prices are $1 less to $2 more than the Bel Air.

The top of Ford's line for 1957 is the Fairlane 500. When first announced, the price of this car was about even with the Bel Air. However, the suggested price has been revised so that the 500 is $42 to $45 higher than the Bel Air.

It's evident that Ford has taken off the gloves and is going to be in a fight to the finish with Chevrolet in 1957.

What does Chevrolet intend to do about it?

As far as prices are concerned, the GM division is content to sit tight. As one Chevy official puts it, "We set our prices and are satisfied that they are competitive. What's so significant about a differential of $1? We think we have the best product available and we will match it with anything our competitors have to offer."

Chevrolet has assumed an attitude of watchful waiting as far as prices are concerned.

Parts Boom Forecast

Predictions are that the automotive parts replacement business in 1957 is going to be one of the biggest in the history of the industry.

Roland S. Withers, general manager of United Motors Service, a division of General Motors, says that car and truck owners will spend more than $4 billion in 1957 for replacement parts. The estimate does not include the cost of labor or of tires.

Basis for the outlook: 65 million vehicles will be in use next year.

THE BULL OF THE WOODS — **By J. R. Williams**

I JUST REMEMBERED I HAVE ANOTHER APPOINTMENT.' IT'LL ONLY TAKE A HALF HOUR--I'LL BE FREE BEFORE YOU GET UP THESE STAIRS-- THEN WE CAN GO OVER THAT NEW DRAWING TOGETHER!
TH' DRAFTIN' BOSS IS GIVIN' TH' BULL A GOOD DIG IN THEIR LITTLE FEUD OF TRICKS! BUT HE LIKES TO PUT ONE OVER ON HIM IN FRONT OF A BIG AUDIENCE!
HE IS! HE KNOWS ALL OF TH' WINDBAGS IN TH' SHOP, AN' THAT'S A DIG AT US, TOO! HE KNOWS IT'LL SOON BE ALL OVER TH' PLACE!
THE COURIERS
10-31 J.R.WILLIAMS

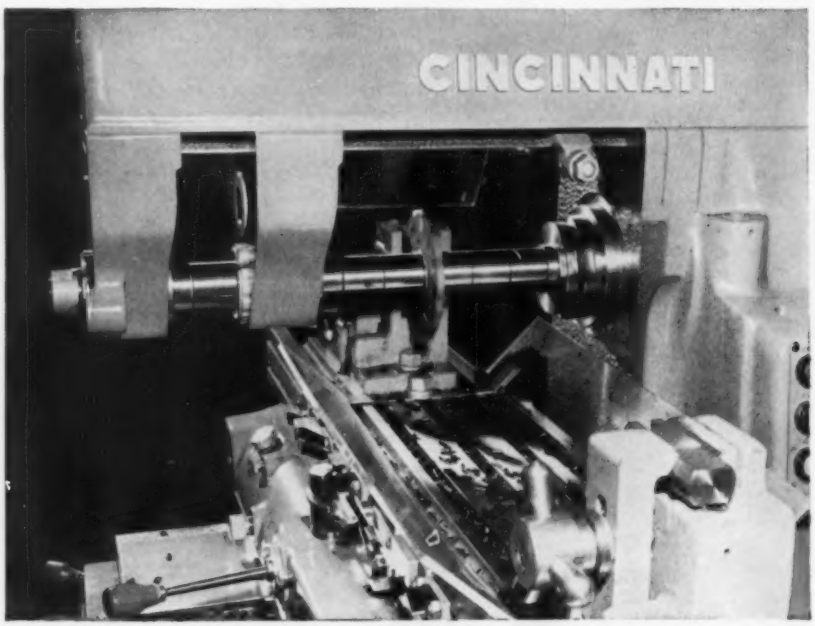
Versatility on this Cincinnati MI *Includes Automatic Milling*

AUTOMATIC RECIPROCATING FEED CYCLE

Automatic reciprocal milling setups, with center safety stop, may be assigned to Automatic Cycle Machines. That's because automatic backlash eliminator is a standard feature.

CINCINNATI

A high production two-fixture setup on a CINCINNATI No. 2MI Plain Automatic Cycle Milling Machine.

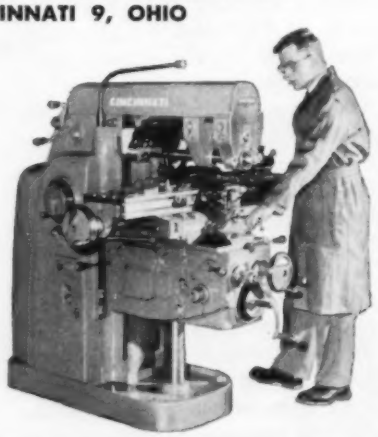


Here's a way to turn in a better cost performance record when you have high production milling jobs sandwiched in between toolroom quantity lots. Just assign all of them to a machine equipped for both high production and toolroom milling. ¶ In the 3 and 5 hp class, CINCINNATI® ML and MI Automatic Cycle Milling Machines will give you the best cost performance record you've ever seen. You can use the automatic table cycles or not, as desired. And for extra high production setups, like the one illustrated here with a fixture at each end of the table, you'll appreciate a CINCINNATI more than ever because of these two advantages:

1) Automatic backlash eliminator
2) Center safety stop

Both are standard equipment on the ML and MI Automatic Cycle Milling Machines. And for a little extra you can also have *automatic spindle stop.* ¶ These automatic features in no way affect the versatility of the ML's and MI's for small quantity production. You can see why if you will write for catalog No. M-1916-1. Brief data contained in Sweet's machine tool file.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO



CINCINNATI No. 2MI Plain Milling Machine. Complete specifications may be obtained by writing for catalog No. M-1916-1.

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MILLING MACHINES • BROACHING MACHINES • CUTTER AND TOOL GRINDERS • METAL FORMING MACHINES
HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID • GRINDING WHEELS

INFLATION: Is Another Round Ahead?

Effects of steel, aluminum price increases are just being felt in industry . . . Recent pay increase to coal miners adds to manufacturing costs . . . Decision on tax amortization delayed—By *G. H. Baker.*

◆ AS A PLANT EXECUTIVE, you're probably finding that the price of just about everything you buy has been going up. Warning: Don't relax yet. The upward spiral is by no means past. You're just now noticing the effects of the higher steel and aluminum wages negotiated last July and August.

Watch your costs and your selling prices carefully, for further increases in your costs are inevitable. The new wage contract negotiated between John L. Lewis and the mine operators provides for an extra $2.40 per day in miners' pay envelopes. As a result, miners will be earning a minimum of $22.25 per day.

More to Come . . . Note that the new average hourly rate for soft coal miners is above that for steelworkers, for autoworkers, or for general factory employees. Lewis won a thumping victory for his men, and the coal operators are planning to pass along the added cost to their customers—to steel companies, electric power utilities, and to the public.

Point is, additional cost increases are going to be noticed all down along the line in the weeks immediately ahead. Steel companies, finding themselves with higher coal costs (captive mines and "outside" mines alike) are going to pass along these higher costs in the form of higher prices. Plan for it now.

Fast Tax Delayed

A decision on whether to reopen fast tax amortization goal for the steel industry and other industries may be delayed well beyond the first of next year while Congress completes a study of the program.

Sen. Harry Byrd, D., Va., powerful tax force in the Senate as chairman of the Finance Committee, has urged Defense Mobilization Director Arthur S. Flemming not to grant any more tax write-offs "about which there is the slightest question" until his committee completes its studies.

The Finance Committee is reviewing the effect of and need for the wartime tax amortization law "under current peacetime conditions," using the staff of the Senate-House Committee on Internal Revenue Taxation.

Mr. Flemming did not expect to come to a decision on the steel industry's $1.8 million in tax amortization requests until shortly after the first of the year anyway, when he would receive new requirement estimates from the Defense Department. Most other industry goals also would not have been reviewed until then, although he has indicated he may consider a new goal for commercial aircraft.

But the request from Sen. Byrd for a delay may hold up for several months more—and could block—a positive action on the part of ODM toward reopening steel goals, and will probably also delay any announcement of a negative decision as well.

More Non-Military Aid For Asia

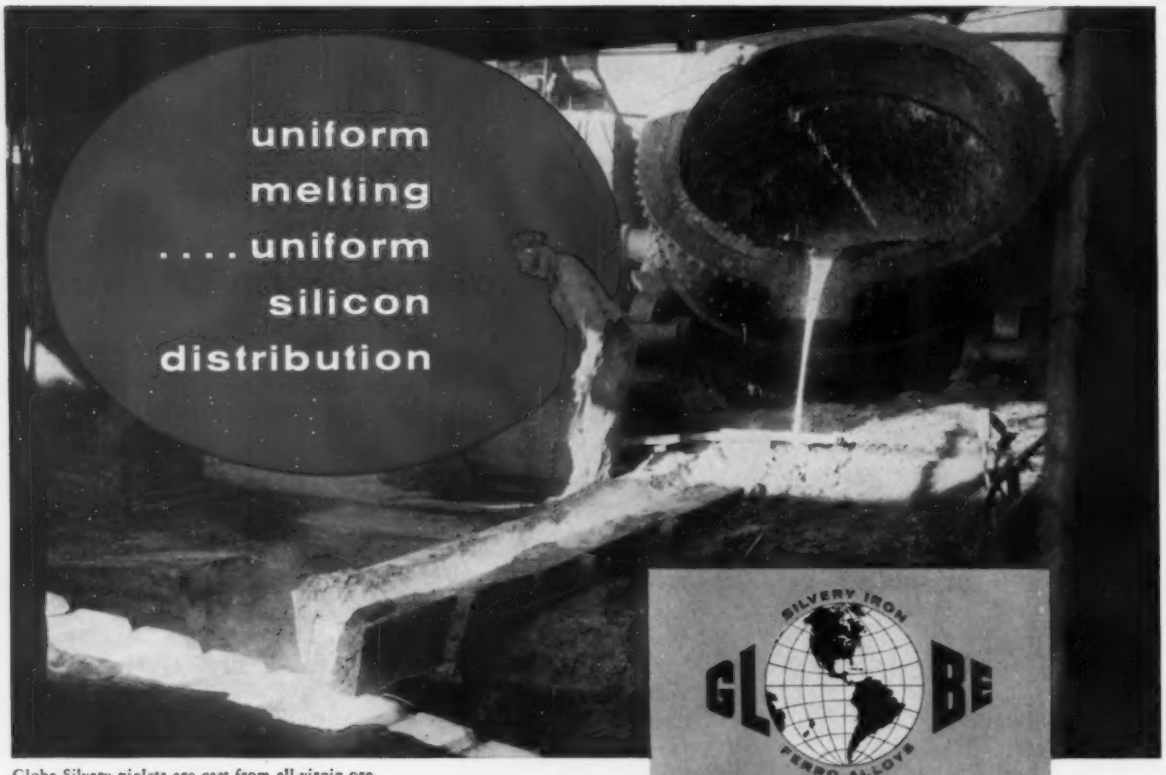
◆ ECONOMIC assistance for countries of Southeast Asia and other Far Eastern areas finally begins to represent a larger share of the nonmilitary aid provided by this country, the U. S. Commerce Dept. reveals.

While this type of foreign aid for Western Europe was halved in fiscal 1956, compared with the previous year, Near Eastern and African states gained slightly, and the portion for Asia generally grew from one-third to more than one-half. Republics in the Western Hemisphere continued to get about 5 pct of the total nonmilitary help.

But it was an expanded transfer of U. S. military supplies and services to nations abroad which pushed foreign aid grants and credits past the $5 billion mark in fiscal 1956. This amount exceeded the fiscal 1955 total by $280 million and reversed a downturn in deliveries that began after 1953. The trend continues.

Military assistance comprised 60 pct of the U. S. aid for the year, as nonmilitary grants dropped 10 pct to $2 billion. Most rapid rise in arms aid was in the form of shipments to the Near East, where they rose by one-third, and in Southeast Asia and the Far East, where they increased by one-fourth.

Nonmilitary aid took a drop in Western Europe, except in Spain. Western Europe received about 60 pct of military supplies, but it made a lower percentage gain than the Asian area.



Globe Silvery piglets are cast from all-virgin ore.

Globe Silvery Pig Iron provides accurate silicon control with all grades ranging from 6% to 16% silicon.

Originated in 1872, Globe Silvery Iron remains, today, in a class by itself. Eighty-four years of research and development are available, through a skilled metallurgical staff, to help you select the correct grade for your requirements.

Service Department available without obligation.

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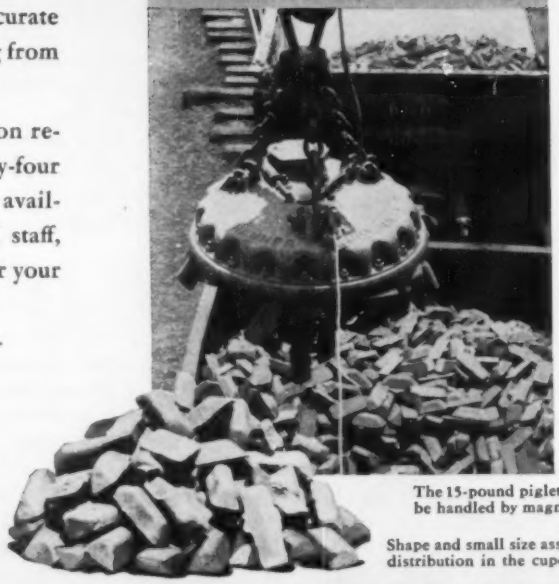

The 15-pound piglets can easily be handled by magnet or hand.

Shape and small size assure even distribution in the cupola.

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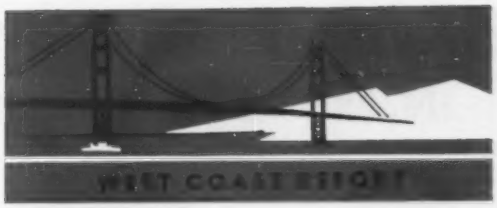


Building Rate Adds to Lure of West

During first six months California area had three new or expanding plants a day . . . In Northern area metals and machinery spent $41 million for improvement . . . L.A.'s gains were impressive, too—By *R. R.* Kay.

◆ THREE NEW or expanding plants every day—600 in all—with a total investment of one-half billion dollars! That's the California story for the first six months of 1956.

And it all adds up to a bigger and bigger market for metalworking's products, equipment, and services.

At the Bay . . . San Franciscans, never a quiet lot, have more than ever to talk about with their latest tally of new and expanding plants. In the first half of 1956 these additions accounted for an unprecedented quarter of a billion dollars. That's 50 pct greater than the previous six-months' high, hit in 1953.

Latest figures show $280 million earmarked for 392 separate industrial projects in northern California. Of this, the San Francisco Bay Area, alone, has listed more than $253 million for 300 plants and expansions. Pushing the region to the top spot in the Far-west was the June volume — a staggering $88 million for a 30-day period.

L. A. in High Gear . . . Contributing the largest bulk to the six-months' total were the transportation industry, $103 million; primary metals and machinery, $18 million; and electrical machinery, $23 million.

With this terrific expansion up north, Los Angeles will have to look to its laurels. However, Los Angeles is in high gear too. For the same period, 60 new plants invested $37 million while $160 million went into 224 expanded plants. And in addition there are 15,000 new jobs. These employees will earn about $68 million a year in wages.

Hawaiian Mill?

West Coast interests, confirming IRON AGE reports of over a year ago, are scouting around in Hawaii for a steel mill site. They're intrigued with the 50,000 tons of scrap the Islands generate each year.

The scrap, now shipped to the U. S., would go to make reinforcing bars, angle iron and other structural shapes, now imported. Savings in freight are sufficient incentive for such a mill, says L. A. Hicks, president of the Hawaiian Electric Co., Ltd.

Mr. Hicks hopes and believes the mill will be equipped with electric furnaces—so his company will benefit directly. The enterprise is still in an early stage, so he won't now identify the "interests." But he emphasizes that this is no idle dream.

Moving Upward

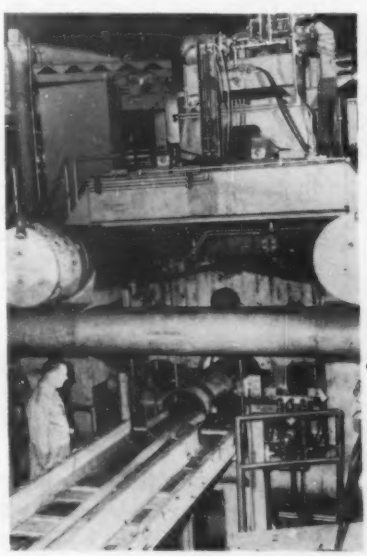
Add these to the list of expanding southern California metalworking firms: American Drill Bushing Co., Los Angeles; Reisner Forge Co., South Gate; Anchor Diecasting Co., Los Angeles; A. E. Peterson Mfg. Co., Glendale, maker of baby strollers, high chairs, car seats.

Applying Pressure for Aircraft Parts

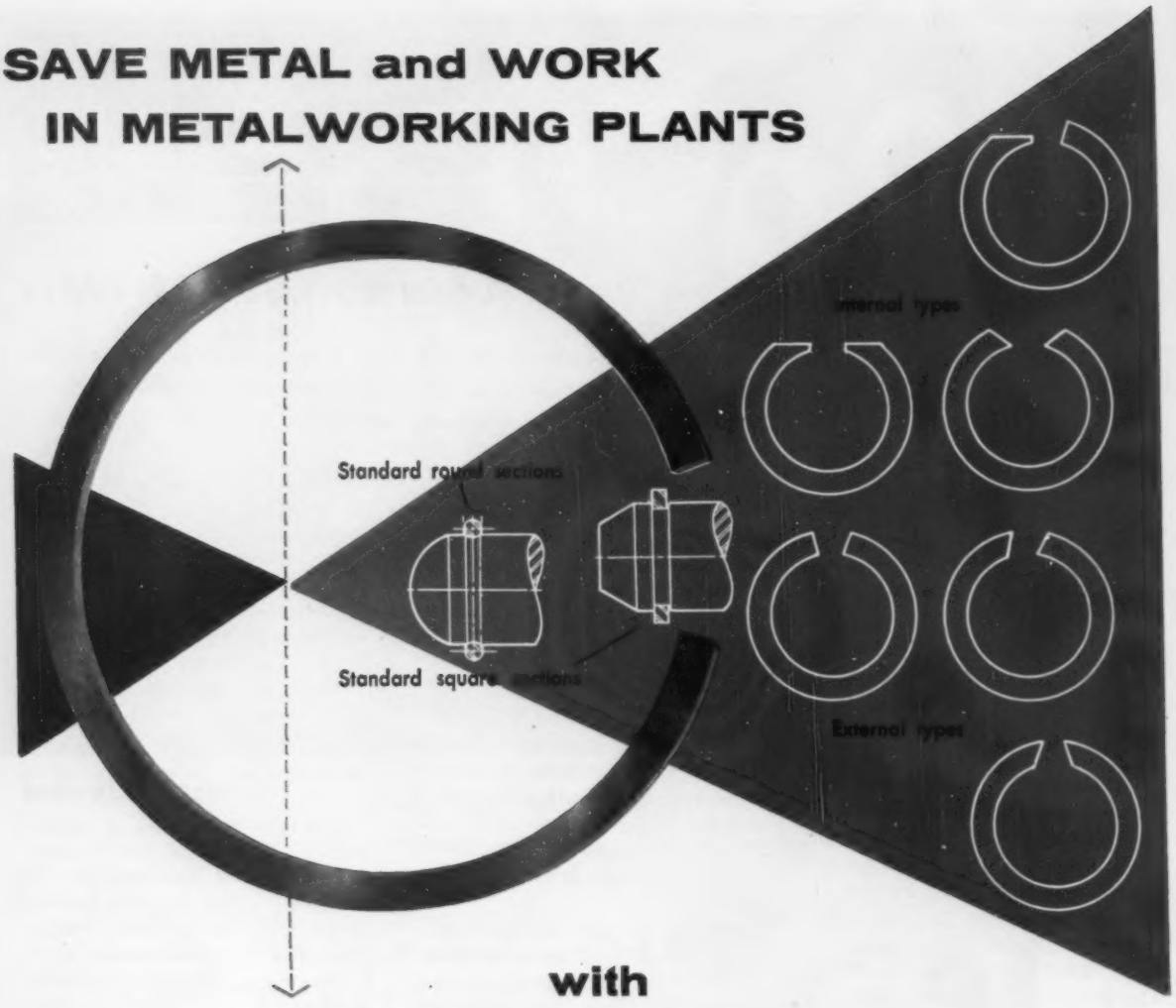
◆ EXTRUSION PRESS capable of 8000 ton pressure is at work for Harvey Aluminum, Torrance, Calif., producing aluminum alloy extrusions for aircraft and missile structural components.

The hydraulic unit—described as the first big press to be operated in the West under Air Force's heavy press program—has an overall length of 288 ft and weighs 4 million pounds.

Large, one-piece structural shapes produced by the press can supplant conventional fabricating methods of joining many smaller components, Harvey reports, thereby offering substantial weight and cost reductions to airframe and missile makers.



SAVE METAL and WORK IN METALWORKING PLANTS



with

RELIANCE SNAP RINGS

Looking for a way to reduce high product cost? There are two logical places to start . . . material and labor. Combined, these two factors are responsible for the major portion of the cost of any manufactured item.

Reliance Snap Rings are now being employed extensively by engineering and production men to reduce waste of valuable materials and at the same time cut expensive machining and assembly time. Previously it was necessary to machine an oversized shaft to form a shoulder. Now it is possible just to machine a groove and snap in a ring, saving metal from the machine shop floor and many hours of machining time. Snap rings can be used as bearing races, serve as shoulders on shafts or in counterbores. Reliance rings will save time and money for you as they have for so many others. Write for details contained in your free copy of Engineering Bulletin 55.

EATON

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SALES OFFICES: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

Do Thread Standards Need Revamping?

Already twice revised, the 1949 Standard for Unified and American threads is undergoing a new change . . . American Standards Assn. hopes it will clear up existing confusion . . . Tables simplified—*By E. J. Egan, Jr.*

◆ ALMOST EVERYONE in the metal industries gets confused by screw thread standards at one time or another. Because it's a complex subject, it leads to many misunderstandings between suppliers and purchasers of threaded components.

American Standards Assn. hopes to clear away the confusion still existing despite the fact that its 1949 Standard for Unified and American Screw Threads has been followed by two subsequent revisions. Hope lies in a 1956 revision of the standard, now in final stages of preparation.

Format Improved . . . Promise is that the format of the 1956 revision will be more convenient to use than any of the previous editions. As announced at last week's Seventh National ASA Conference in New York, only essential information will be included in the body of the new revision.

Six sections at the front of the standard will contain all pertinent text. All tabular material concerning standard threads and selected combinations is concentrated in two tables, and they're arranged so that all threads of a given diameter appear together in sequence.

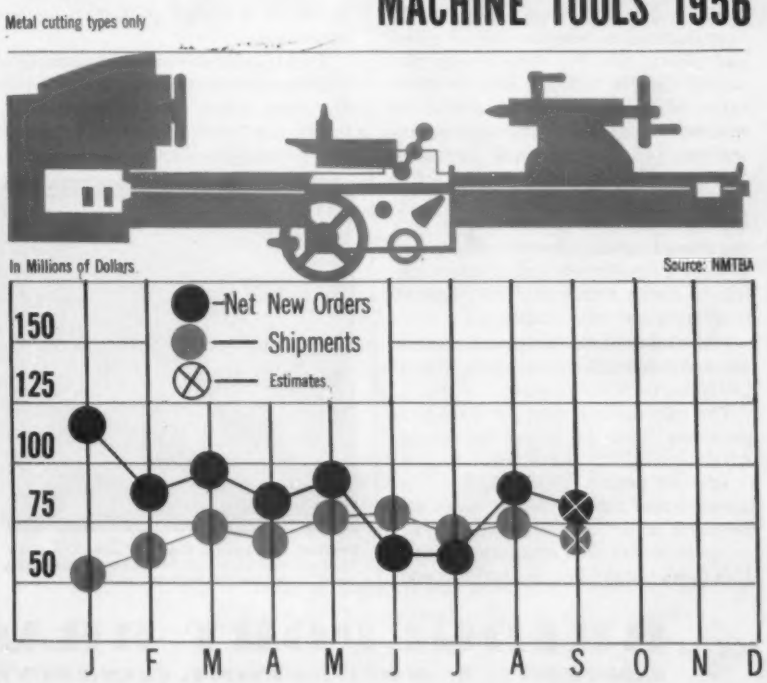
Thus, within a small space on a single page, it will be possible to "locate all necessary data for a given diameter pitch combination, as to designation, standard thread classes, limits of size and pitch diameter tolerances."

Cutting Tool Sales . . . Estimated shipments of metal cutting machine tools totaled $71.2 million in September, according to National Machine Tool Builders' Assn. Net new orders for the same month are estimated at $79.6 million. For the first nine months of this year, shipments were 32 pct greater and net new orders 34 pct greater than the same period in 1955.

Assn. officials expect the 1956 total of metal cutting machine shipments to be approximately $840-$850 million. That's somewhat less than the $1 billion figure hoped for at the beginning of the year, but considerably better than 1955's $670 million.

West German Exports . . . Across the water, West German Machine Tool Assn. reports that exports by the country's builders may reach $126-$140 million this year. This would be about 40 pct of total production, compared with a pre-war percentage of 25 pct and a high of 50 pct during the Korean emergency.

Tell Berna, executive vice president of National Machine Tool Builders' Assn., was awarded a citation by AIEE last week in recognition of his help in encouraging American industry to "rapid and orderly progress in the electrification of machine tools." Occasion was the AIEE Machine Tool Conference in Cincinnati.



BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

Bridgeport Brass Co.

Reporting new developments in copper-base alloys and metalworking methods.

These copper wall tiles made from Bridgeport copper are ideal where rich, warm decoration is desired. (Photo courtesy House of Time, Inc.)

Bridgeport Copper Gives Gleaming Beauty to Vikon Tile

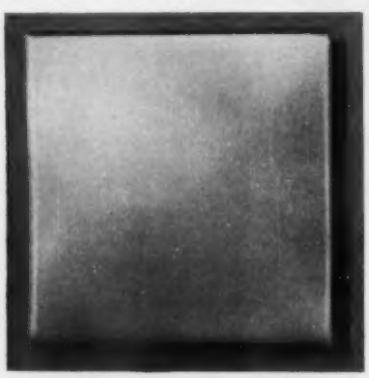
Vikon Tile Co., Washington, N. J., manufactures a complete line of metal and plastic tile. For their copper tile, widely used in kitchens and for decorative effects, it was important that the material chosen fit very exacting requirements—and Bridgeport Copper met those specifications.

The copper had to be easy to cold-work and have the right temper to give the desired rigidity after forming. It had to have a consistently unblemished surface to assure a uniform finish. Ease of lacquering was also important.

For these tiles, Bridgeport recommended and supplied Alloy #102, 28 gage (.0126 in. thick) roll copper.

The roll copper is first put through a passifator bath to retard tarnishing. After drying, the passifated copper is sent to presses for stamping. The stamped tiles then go to the spray department where they are coated front and back with a clear synthetic lacquer. This finish is baked on the surface, and serves as a further protection against tarnishing.

This is another successful example of a Bridgeport metal that is *matched to the job*. Vikon, like other manufacturers, has found Bridgeport a dependable source of quality material.



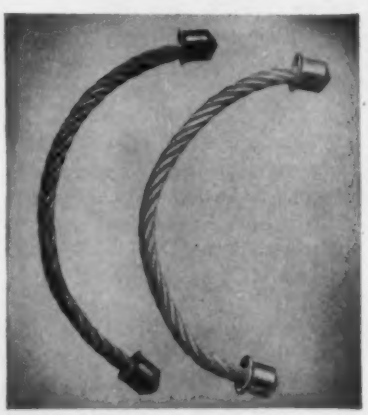
Finished tiles have a beautiful satin-like sheen. The burnished surface allows tiles to be alternately placed to obtain checkerboard patterns.

Railhead Bond Made From Bridgeport Phono-Electric Rod Gives Dependable Service

Hanlon & Wilson Co. of Wilkinsburg, Pa., manufactures their quality rail bond from Bridgeport Phono-Electric Cadmium Copper, Alloy #985.

For the terminals, Hanlon & Wilson needed a metal that had a coefficient of expansion approximating railroad steel . . . one that had excellent cold-flow properties as well as high conductivity. High strength and maximum resistance to corrosion were also desirable qualities.

Bridgeport Technical Service studied the requirements for the rail bond, then suggested Alloy #985, Phono-Electric Cadmium Copper rod, in ½" diameter. Terminals were drilled through, pressed in three operations and rotary swaged to the cable. The cable strand is made from Alloy #985 wire.



Hanlon & Wilson Co. rail bonds are shown before plating (at left) and after plating (at right).

Both in manufacturing processes and in actual use, Bridgeport Alloy #985 proved to be entirely satisfactory. Why? Because the metal is *matched to the job it is expected to do*. This metallurgical service is available to you without obligation. Just phone or write your nearest Bridgeport Sales Office for expert advice . . . and for high-quality brass, copper and aluminum. (013)

Bridgeport Brass Co.

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Mills at Bridgeport, Conn., Indianapolis, Ind., and Adrian, Mich. Sales Offices in Principal Cities—Conveniently Located Warehouses

The Iron Age SALUTES

Eugene C. Rook

Retiring from the U. S. Navy after an outstanding 34-year career, he joined Blaw-Knox Co., and did a smooth job of reorganizing its Equipment Div.; now is vice president and general manager of fabricating.

When Capt. Eugene C. Rook packed his sea bag for the last time on June 30, 1954, the U. S. Navy was losing one of its best administrative engineers to private industry. He had served 34 years in the Navy, but he was far from a fish out of water when he hit the beach.

Blaw-Knox Co., looking for a crack organizer to revamp its equipment division, chose Capt. Rook for the job. Some of his civilian subordinates were expecting to gag under a flood of military-type memos, stern orders and rigid rules. But the Captain's understanding of working relationships became evident as he set about remodeling the division.

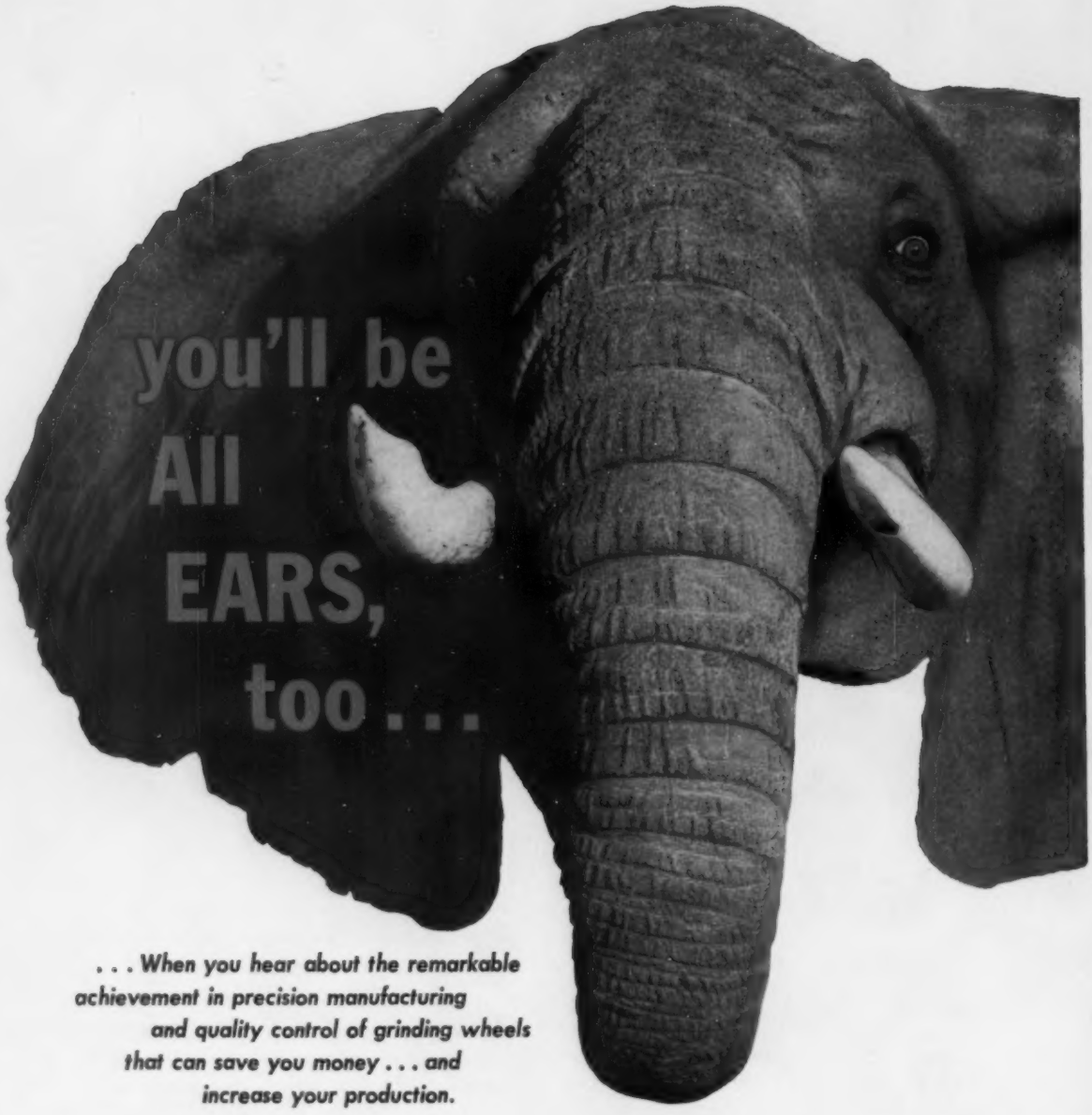
He carried out the touchy job of realignin responsibility with remarkable smoothness. He has since been named vice president and general manager of fabricating, with six divisions under command.

Even though he had seen many months of sea duty—as gunboat officer in the South China patrol and as a commander of landing craft during World War II—Capt. Rook was too good a man to keep cooped up on a ship. Early in his career, after graduating from Annapolis, the Navy sent him to Carnegie Institute of Technology, where he picked up a master's degree in metallurgical engineering.

In the ensuing years, he saw a lot of duty ashore with industry. Starting as a naval inspector, he later became head of the Naval Ordnance Plant, York, Pa., and the Naval Ammunition Depot, Crane, Ind.

As one associate puts it, a big reason for the Captain's success is "his great gift for handling people." Capt. Rook himself places emphasis on the "integrity of the team."

Take a page from this salty sailor's log: "There are no one-man crews in anything afloat bigger than a rowboat. And today's business is not rowboat size."



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Grinding Wheels

L. H. JUENGLING, elected corporate vice president, Sheffield Div., Armco Steel Corp.

The Iron Age INTRODUCES

Edward E. Helm, elected president, **Reliance Electric & Engineering Co.,** Cleveland.

Mark T. Anthony, appointed asst. to vice president and general manager, **Kaiser Steel Corp.,** Oakland, Calif.

Robert O. Bass, named executive vice president and asst. general manager, **Morse Chain Co.,** Ithaca, N. Y.

H. R. Leber, elected vice president, **Sundstrand Michigan Corp.,** subsidiary of Sundstrand Machine Co., Rockford, Ill.

H. M. Harper, Jr., named asst. to president, **The H. M. Harper Co.,** Morton Grove, Ill.

George E. Handtmann, named asst. to president, office operations, **Joseph T. Ryerson & Son, Inc.,** Chicago; **James E. Dittus,** appointed director, quality; **Rolla R. Ross,** appointed manager, systems and procedures; **George G. Moody,** named office manager; **George H. Blank,** named asst. to general office manager.

Richard B. Lord, appointed director, Product Development Div., Commercial Dept., **U. S. Steel Corp.,** Pittsburgh.

Robert E. Hagen, named superintendent, Saxonburg plant, Edgar Thomson Works, **U. S. Steel Corp.**

Richard E. Krafve, elected vice president, **Ford Motor Co.,** Dearborn, Mich.

Thomas E. Rounds, appointed vice president, **The Barden Corp.,** Danbury, Conn.

William H. March, appointed manager, Yale combination door hardware sales, **The Yale & Towne Manufacturing Co.,** White Plains, N. Y.

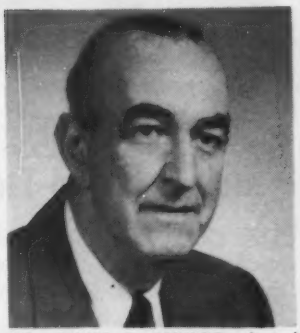
Gerald J. Weihofen, appointed railroad industry specialist, **Kaiser Aluminum & Chemical Sales, Inc.,** Chicago.

Arthur A. Currie, named asst. general sales manager, Television-radio Div., **Westinghouse Electric Corp.,** Metuchen, N. J.

Following appointments are within the Comptroller's Div. of **Wheeling Steel Corp.,** Wheeling, W. Va.: **C. L. Millick,** named manager, Inventory Dept.; **John H. Schneidmiller,** named systems analyst; **A. H. Stender,** named manager, Tabulating Dept.; **W. A. Carney,** appointed asst. manager, Tabulating Dept.

Reginald C. Morrell, appointed market research manager, **Associated Spring Co.,** Bristol, Conn.

Oscar J. Olsen, named merchandising manager, **Peter A. Frasse & Co., Inc.,** New York.



DR. JAMES C. HODGE, elected executive vice president and director, Warner & Swasey Co., Cleveland.

J. J. PUNKE, elected executive vice president, Precision Castings Div., Harsco Corp., Syracuse, N. Y.

FRANK L. KELSEY, appointed manager, Indianapolis office, Niagara Machine & Tool Works, Buffalo, N. Y.

...the *only* Coupling with truly Spherical Teeth

This exclusive coupling is widely endorsed for use on Tandem cold mills, Hot mills, Roller levellers, Pinch rolls, Slitters, etc.—wherever counter-rotating rolls are found—where compensation for angular and parallel displacement is required to facilitate roll changing—and to compensate for variable roll centers due to work roll grinding and/or due to thickness of material requirements. Sphereflex Roll Shaft Couplings give ±7% angular capacity, with a very minimum of backlash.

Sphereflex is the *only* coupling with truly *spherical teeth:* Root diameter, pitch diameter and outside diameter are generated as segments of concentric circles, giving a ball and socket action, and assuring highest torque-carrying capacity... all mating teeth maintain an area contact under load at the center of the male cut teeth, thereby *preventing rolling point contact* at maximum misalignment.

All exclusive points of design and construction of this unusual coupling are illustrated and explained in Bulletin C-561 . . . Send for copy on your Business Letterhead.

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Philip O. Geier, Jr., appointed asst. manager, **Cincinnati Milling Products Div.,** Cincinnati Milling & Grinding Machines, Inc.

Hyman Rosenthal, named director, research, **Arwood Precision Castings Corp.,** New York.

John B. Beltz, named asst. chief engineer, **Oldsmobile Div.,** General Motors, Lansing, Mich.

Dr. James K. Sprinkle, appointed applied research engineer, applied research and development laboratory, Foundry Dept., **General Electric Co.,** Schenectady, N. Y.

Following appointments are within the General Purchasing Dept. of **Kaiser Aluminum & Chemical Corp.,** Oakland, Calif.; **Robert G. Stanwood, Clarence D. MacMillan** and **Robert S. Aubry,** named general purchasing agents; **Charles L. Jack,** appointed asst. to manager, purchasing.

James E. Hays, appointed Indianapolis sales representative, Lacled-Christy Co., Div., **H. K. Porter Co., Inc.,** St. Louis, Mo.

Spencer H. Wright, named sales and engineering representative, Washington, D. C. area, Cone-Drive Gears Div., **Michigan Tool Co.,** Detroit.

H. Don Shockley, named rectifier sales engineer, West Coast, **Hanson-Van Winkle-Munning Co.,** Matawan, N. J.

R. Elwood Gray, named works manager, Commercial Div., **Kaiser Metal Products, Inc.,** Bristol, Pa.

Byron E. Blakeman, named quality control consultant, Helipot Div., **Beckman Instruments, Inc.,** Newport Beach, Calif.

Bruce A. Guinter, named plant engineer, Electro Dynamic Div., **General Dynamics Corp.,** Bayonne, N. J.

William J. Zechel, named chief automotive design engineer, **American Motors Corp.,** Detroit.

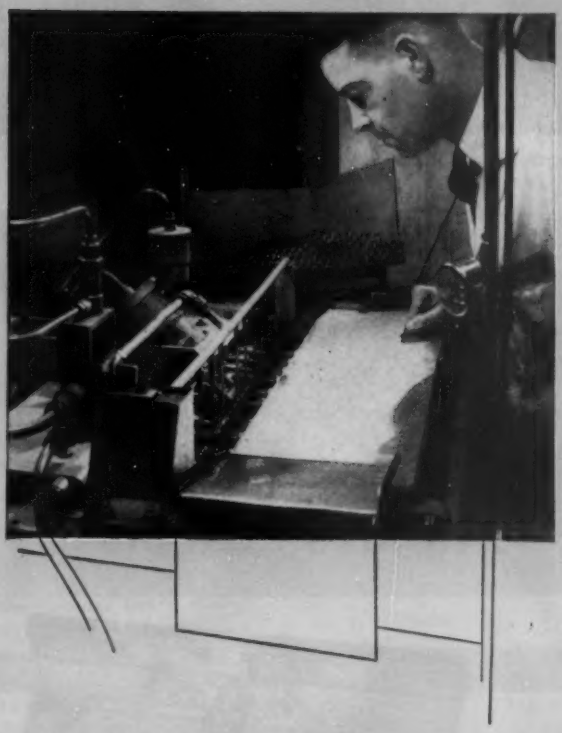
STANLEY J. ROUSH, elected group vice president, Borg-Warner Corp.

SAM GURLEY, JR., elected vice president, sales, H. K. Porter Co., Inc., New York.

THOMAS H. CONNER, named comptroller, Johnson Bronze Co., New Castle, Pa.

JAMES G. RAYBURN, elected vice president and general manager, The Lamson & Sessions Co.

'dag' dispersions... *a touch does so much!*



Tool-life increased 60 times

In an unusual multiple-spindle drilling operation, a machine-tool firm found that straight cutting-oil did not give satisfactory performance. Drills constantly had to be resharpened after sinking about 50 holes.

However, when a 1:300 dilution of a **'dag'** dispersion of colloidal molybdenum disulfide in oil was tried, tool life before resharpening was extended to 3,000 holes!

This result is typical of the production improvements which can be realized through the use of this outstanding new high-pressure lubricant. Whatever your machining operation, it is likely that molybdenum disulfide can help. And Acheson Colloids' service engineers can give you the benefit of their experience in its application. Why not get in touch with your nearby Acheson representative? Meanwhile, write for your free copy of Bulletin No. 424.

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ACHESON COLLOIDAL DISPERSIONS:
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Yes, I want to get your free catalog on 'dag' dispersions for use in Industrial Lubricants.

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Favorable reports on the fabrication of A.I.S.I. Types 201 and 202 are flowing in from manufacturers of a wide variety of stainless steel products ranging from sinks and housewares to hub caps and trailer trucks.

These reports clearly indicate that the 200 series can be fabricated on present equipment without difficulty—without any additional investment in tooling, in most cases. And possibly at savings in certain operations. In fact, skilled equipment operators—the men who work with stainless day after day—have been unable to distinguish between the 200 series and other types when they were intermixed in production runs.

The 200 series is a relatively new member of the family of Republic ENDURO® Stainless Steels. It offers high strength, corrosion-resistance, and easy formability, including draw-bench forming, roll forming, brake bending, blanking, stamping, embossing, trimming, deep and shallow drawing, welding.

Consideration of 201 and 202 for design and fabrication of your present or projected items should be based on the merits of these two types and not as alternates for other grades. However, they are being used interchangeably with other grades.

Our booklet, No. 735, has the latest information on the properties, test evaluations and potentials of these new austenitic stainless steels containing 17% Cr—4% Ni—6% Mn and 18% Cr—5% Ni—8% Mn. Republic Stainless Steel metallurgists and specialists are ready to help you apply Types 201 and 202 to your production. There's no obligation. Just send the coupon to let us know if you would like a representative to call at your plant.

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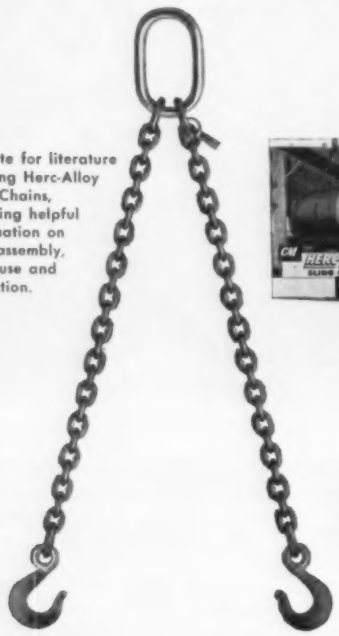
● Write for literature covering Herc-Alloy Sling Chains, including helpful information on their assembly, care, use and inspection.



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Paul J. Suso, named export manager, **The A. J. Alsdorf Corp.,** Chicago.

Thomas G. Digges, appointed asst. chief, Metallurgy Div., **National Bureau of Standards,** Washington, D. C.

Edward Hartshorne, named general manager, Nuclear Fuel Div., **Olin Mathieson Chemical Corp.,** New Haven, Conn.

Thomas B. Davis, appointed production superintendent, Santa Rosa, Fla., plant, **NRC Metals Corp.,** subsidiary of National Research Corp.; **Jack W. Blanton,** named manager, sales development.

John L. Carnie, named general manager, Can Div., **Crown Cork & Seal Co., Inc.,** Philadelphia.

M. S. Stevenson, named manager, Dallas, Tex., branch office, **Baker-Raulang Co.,** Cleveland.

Ralph C. Wolf, appointed superintendent, Blooming and Skelp Mills, Campbell plant, **The Youngstown Sheet and Tube Co.,** Youngstown, O.

Harry D. Santmyer, appointed chief shipper, Canton Steel plant, **Republic Steel Corp.; E. Hall Jones,** appointed asst. manager, shipping, Massillon, O.

Louis G. Jordan, named asst. chief engineer, industrial products, Industrial and Automation Engineering Dept., **Vickers Inc.,** Detroit; **Carl A. Brown,** named asst. chief engineer, automation systems.

OBITUARIES

Fred S. Gichner, 85, president, **Fred S. Gichner Iron Works, Inc.,** Washington, D. C.

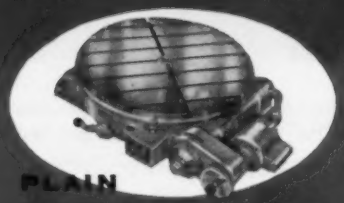
Mark E. Morgenstern, 62, New York district manager, sales, **Detroit Steel Corp.,** Detroit.

John E. Poorman, 85, president and founder, of the **J. E. Poorman, Inc.,** Philadelphia.

Accurate . . .
to Seconds!

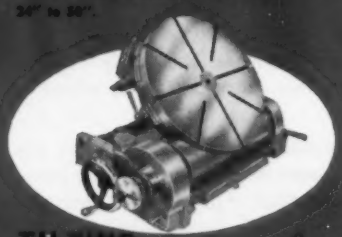
PRATT & WHITNEY
Precision
ROTARY TABLES

3 BASIC TYPES



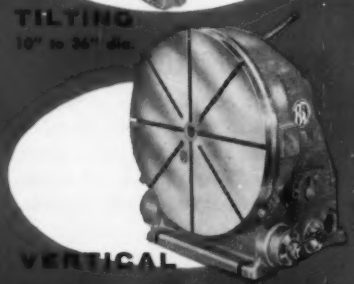
PLAIN

Hand; 12" and 36" dia. Motor-Driven; 24" to 36".



TILTING

10" to 36" dia.



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Motor-Driven; 30" and 48" dia.

Like the timer's stop watch, Pratt & Whitney Rotary Tables are *accurate to seconds* . . . seconds of arc, that is! And they're built for ruggedness and stamina too. They'll help you eliminate expensive jigs and set-up changes on difficult, precise machining jobs year after year. Ideal, too, for reliable inspection and circular indexing.

Featured here is the latest in this advanced line . . . the new 42" Plain Rotary Tables WITH AUTOMATIC INDEXING. Work is automatically positioned to any desired angle by means of easily set dogs. Initial *and* repeat settings are made with the same dependably high accuracy.

Now . . . Pratt & Whitney Rotary Tables can also be furnished with indexing control by **numerical data.**

WRITE FOR COMPLETE INFORMATION . . . ask for illustrated circulars fully describing P&W Precision Rotary Tables.

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10 Charter Oak Boulevard, West Hartford, Connecticut

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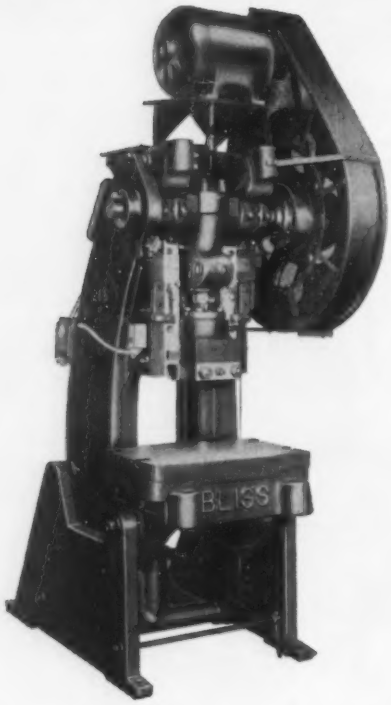
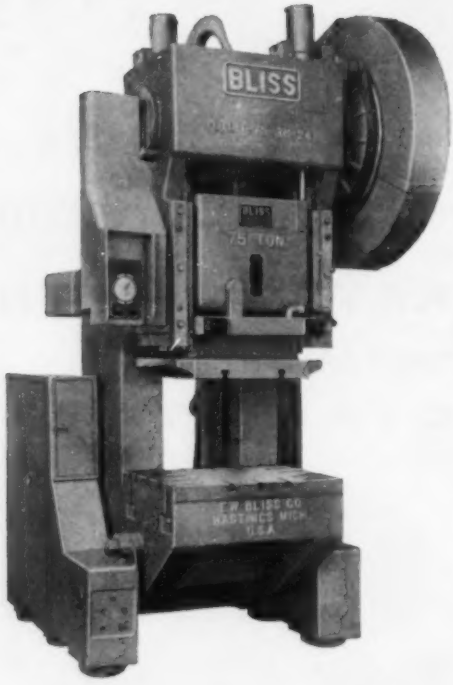
MACHINE TOOLS • GAGES • CUTTING TOOLS

Bliss inclinables offer you a wider



Standard Inclinable Presses—as furnished in the 10 to 125 ton range. No. 21-S press, 45 ton capacity, shown here.



Enclosed Inclinable Presses—75 to 200 tons. A 75-ton capacity model is shown here.

More standard types Bliss builds *23* standard inclinables—open-back inclinables, JIC inclinables, hydraulic inclinables, double-crank inclinables . . . offers a wider range of capacities and bed areas than any other make.

More standard clutches The Bliss Positive rolling key clutch and a choice of Bliss crankshaft or driveshaft mounted air friction clutches have been proved on thousands of presses. Bliss has the type of clutch best suited to your work.

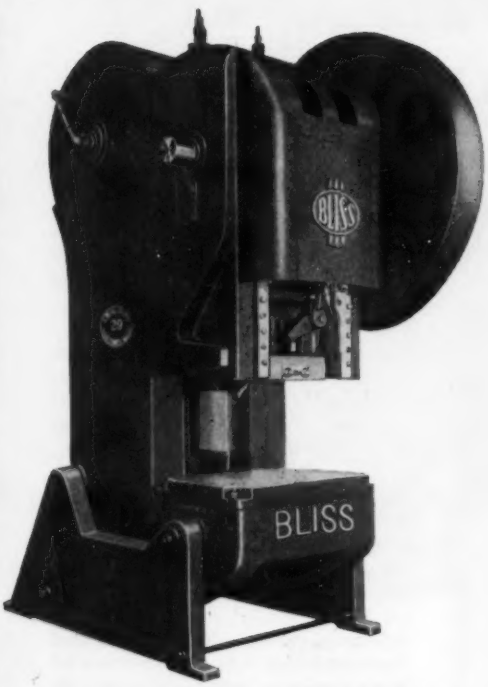
More standard feeds Bliss designs and manufactures its *own* line of roll and dial feeds. This single responsibility for both presses and feeds is the press user's assurance that feeds are easily installed and easily adjusted.

More standard cushions Five different types of cushions, in a range of sizes that meet every need, make any Bliss inclinable a double-action press. Cushions are especially designed for the press, and the presses designed to receive them—either assembled to press before shipment or easily installed years later.

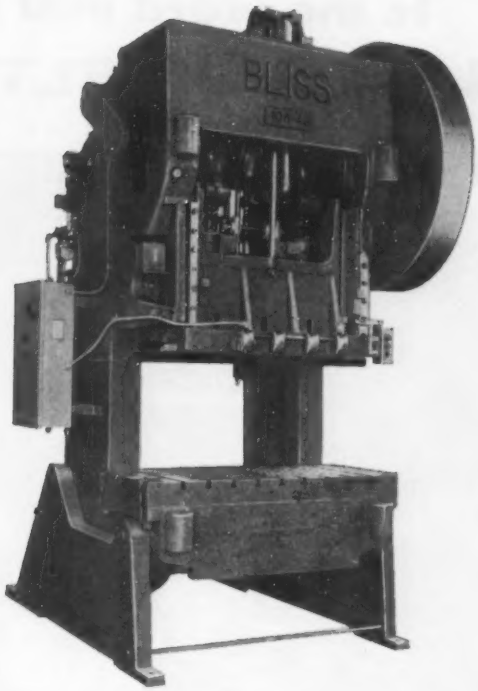
. . . And a million dollar parts and service program to protect your investment!

Because Bliss *mass-produces* its inclinables, maintaining a stock-pile of spare parts is a simple matter. The million-dollar inventory of spare parts of Bliss' inclinable plant is by far the largest in the industry and includes clutch plates and parts, shafts, gears, pinions and the like. Moreover, Bliss maintains a separate, specially-trained organization whose sole purpose is to service your spare parts needs as quickly as possible.

choice of standard types and sizes



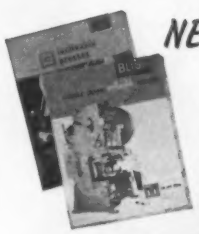
Standard Enclosed Inclinable as furnished in 150 and 200 ton sizes. No. 29, 150-ton capacity, is shown above.



Double-crank Inclinable Presses—from 18 to 175 tons. No. 108, of 100 tons capacity, is shown here.

A few of the reasons why BLISS inclinables outsell all other makes ... *and always have*

- Cast Meehanite frame—stronger, tougher. Fine grain structure dampens noise and vibration.
- Clutches—whose design has been proved by the thousands now in use.
- Gibs are close fitting, extra long, and insure accurate slide alignment at all points in the stroke. Simple to adjust so that original accuracy can always be maintained.
- Choice of hand, semi-automatic or automatic lubrication.



NEW catalogs now available

32 pages—describes frames, feeds, clutches, cushions and complete line of open back and enclosed single-crank inclinable presses. Gives dimensions and specifications. Catalog No. 2-D.

12 pages—describes these versatile extra-width double-crank presses. Gives dimensions and specifications for entire line. Catalog No. 3.

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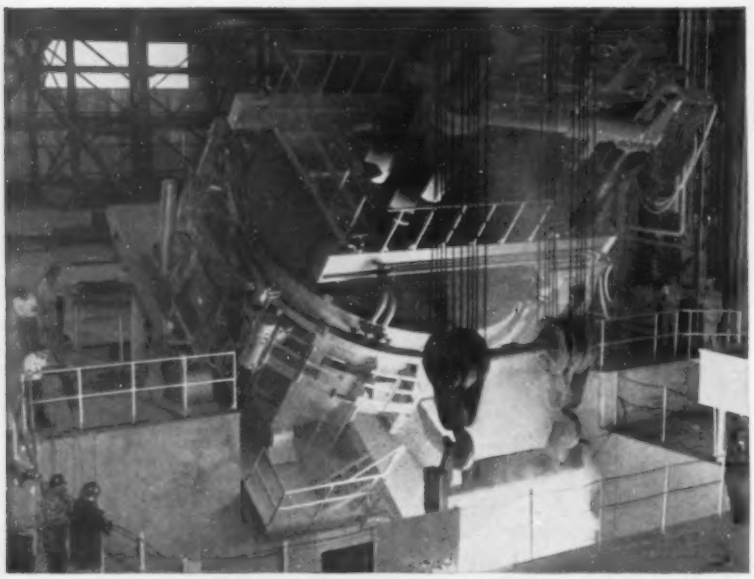
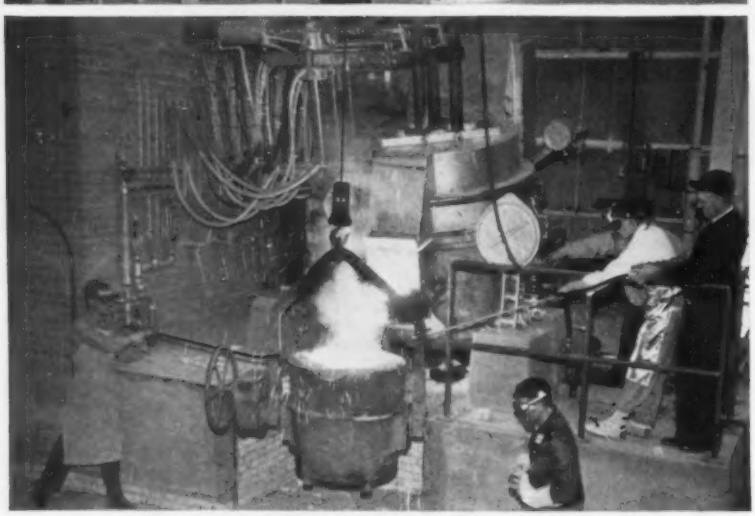
evolutionary

is the word that best describes LECTROMELT* FURNACES





● Lectromelt's revolutionary announcements were made years ago, when these developments were first introduced by Lectromelt to the metallurgical industry:

Top charging for smooth, fast turnaround in electric furnace operation. There's less downtime between he[illegible] and less heat loss. Linings and the electrodes last longer.

Power input boosted tremendously, doubling the day's output. Lectromelt construction was heavied up, larger transformers and leads provided, more efficient cooling added.

Micro-accurate electrode control was combined with counterbalanced arms, greatly increasing the exactness to which analyses could be held. Supervisory labor was thus made much less burdensome.

Why label as revolutionary the things that have long been standard on Lectromelt Furnaces? The same bold thinking—evolutionary thinking—has been constantly applied to Lectromelt Furnaces and Equipment to maintain the leadership established many years ago.

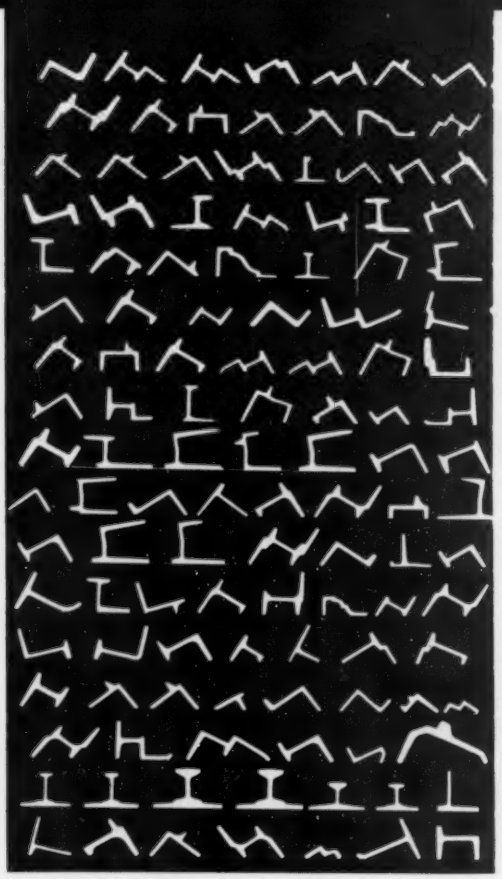
Catalog 9-B describes Lectromelt Furnaces. For a copy, write Lectromelt Furnace Company, 312 32nd Street, Pittsburgh 30, Pennsylvania (a McGraw Electric Company Division).

On research and on production, Lectromelt Furnaces provide the precision of control so necessary to the steelmaker.

Manufactured in . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa . . . JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF

WHEN YOU MELT... *Lectromelt*



FEATURE ARTICLES

Less machining required—

Hot-Rolled Special Sections Carry Built-In Savings

By W. H. MOHR, Special Engineer, Bethlehem Steel Co., Bethlehem, Pa.

◆ **Steel bars, hot rolled to special cross-sectional profiles, offer product manufacturers many potential benefits . . . Major items include: less machining, freight savings, excellent strength and surface finish.**

◆ **Judged by overall production economy, special sections are often less expensive than standard bar stock, forgings, or castings . . . In some cases, these rolled shapes provide the only answers to tricky fabrication problems.**

◆ WHEN TO USE standard shapes of hot rolled steel and when to use special rolled sections are questions that frequently confront product designers and manufacturing executives.

Bars hot-rolled to standard AISI shapes often require extensive forming and machining operatons, whereas special sections usually require little or no additional shaping. Ultimate point to decide is whether the advantages of special sections outweigh their somewhat higher price, compared with standard shapes.

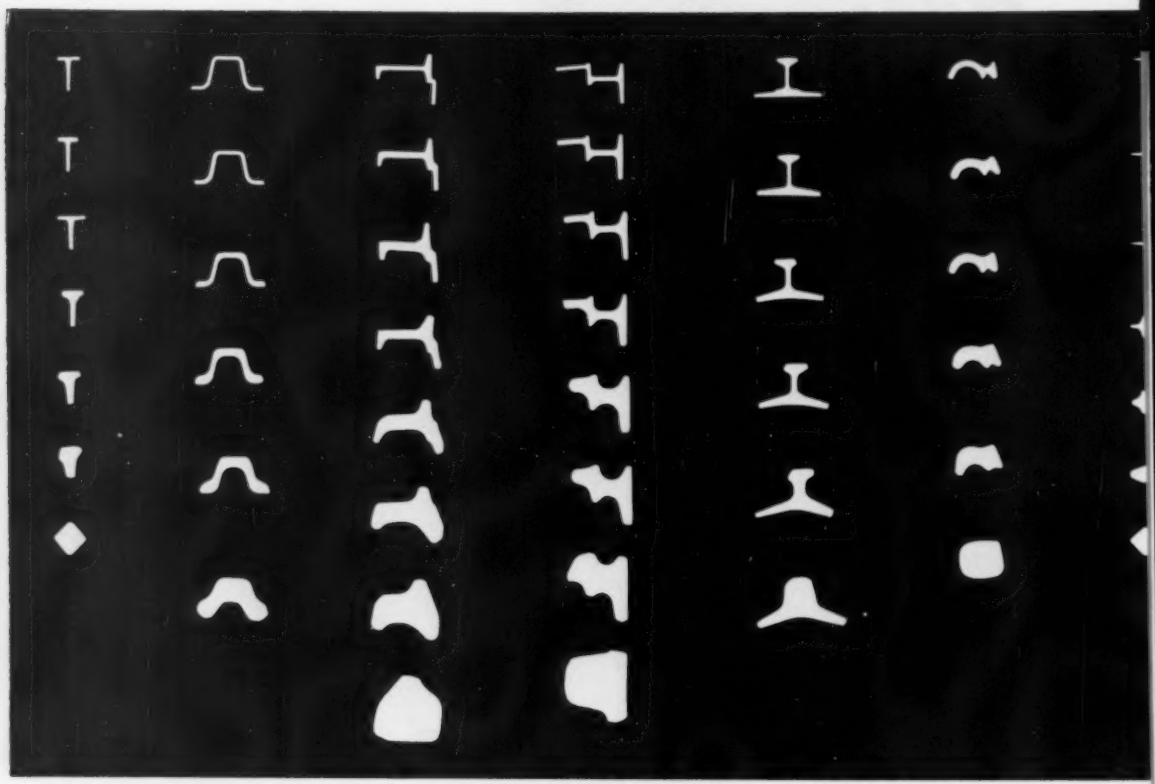
Special sections are those not otherwise classified by AISI. They comprise a wide variety of shapes, rolled in accordance with customers' designs and other specifications.

Conventional designs such as channels, half rounds, tees and the like, which vary dimensionally from AISI standards, are also considered special sections. Ordinarily, however, the term denotes shapes differing radically from standard designs—often far more complex and produced with specially prepared rolls.

Special sections have almost limitless uses, since they can be rolled to close tolerances to meet widely varying requirements. In numerous instances, Bethlehem Steel Co. engineers have translated a customer's simple pencil sketch into a practical answer to his problem.

Such versatility, however, requires much special equipment and a great amount of skill and experience in every step of the operation, from roll design to inspection bed.

Special sections are usually produced on hand mills, although semi-continuous mills are sometimes used. The number of roll passes varies, but



PROGRESSIVE steps are required (from bottom to top) to roll these typical special sections.

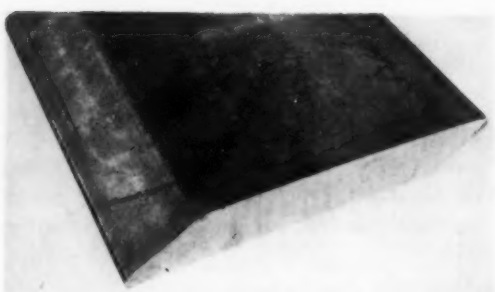
seven would be typical. Rolling steps required for some representative shapes are shown in an accompanying illustration.

Depending upon their size, special sections must be rolled in relatively large tonnages. With carbon steels, about 25 tons is the minimum tonnage normally rolled on smaller mills; 150 tons on larger mills. Alloy sections are rolled in somewhat smaller tonnages.

Although special sections usually cost more per pound than standard bar stock, they may offer sizable net savings by minimizing machining, grinding, punching, welding, riveting, and other operations. Fewer production steps mean less labor and tool cost, lower freight and handling charges, and reduced scrap losses.

To illustrate, the carriage rail for an electric typewriter, originally made from a small, flat bar, required machining away about 17 pct of the steel. Substitution of a special section, cold drawn after rolling, eliminated machining and resulting metal loss, also increased wearing qualities of the part.

Compared with forged stock, rolled special sections usually cost less, especially where large tonnages are required. Moreover, rolling imparts strength comparable to that achieved by forging. And because they are available in bar lengths, special sections may often be processed



ROLLING beveled edges on heavy plate eliminates the costly machining that was required formerly.

more economically than individual forging blanks. For example, many finished parts are made from special section bar stock on automatic screw machines.

Quite often, the same advantages apply when special sections are compared with castings. Ordinarily, the comparison is between a fabricated assembly, of which the section is only a part, and an integral casting. Sometimes a single section may be substituted for an assembly made up of or including castings and other parts.

Pound for pound, rolled components are usually stronger than cast parts, an important consideration where strength is required in the finished

Typical Applications of Special Sections

Building Products: Steel window sash. Bridge flooring. Serrated catwalks. Bar joists. Concrete pipe couplings. Spouting channels. Poured-roof purlins. Conveyor rails. Steel pipe couplings. Elevator guide rails. Timber rings.

Automotive Parts: Tire rims. Hinges. Electric motor pole pieces. Trunnion bearings. Brake shoe tees. Latches and striker plates. Pump pawls. Axle channels for buses. Leaf springs.

Railroad Equipment: Brake shoes. Brake beams. Track tools. Gondola car banding strip. Lock nuts. Splice bars. Tie clips. Rail anchors.

Agricultural and Construction Equipment: Tractor track shoes. Scraper blades. Plow beams.

Miscellaneous: Sled runner tees. Mine bits. Steel furniture. Pole line hardware. Fence posts. File steel.

Why Users Like Special Sections

- **reduced machining cost.**
- **lower fabricating cost.**
- **less expensive than forgings.**
- **freedom of design.**
- **allow design for strength where needed.**
- **good blank design for coining and cold forming.**
- **can be used as screw machine stock.**

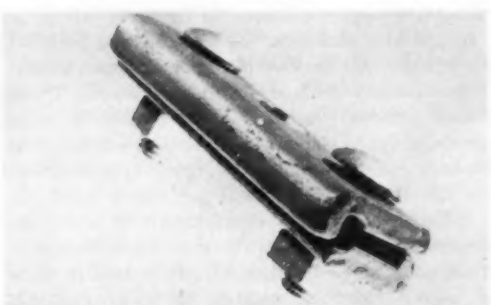
item. This makes it possible to use less material, which means a lighter, less bulky product.

In certain other cases special sections are used to advantage on parts formerly fabricated from strip and plates. These include applications where the material must be processed by flame cutting, welding, machining, forming, etc., and where, after processing, it is within the bar or structural size range.

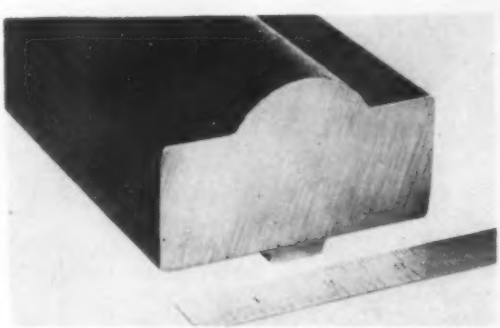
An integral part made from special sections is often stronger and more durable in service than the same part fabricated from components. A manufacturer of coal mining machines, for example, uses special sections as the chief structural members of a cutter bar. He states: "The thinner solid steel section is much stronger than a fabricated bar . . . there are no rivets to work loose."

The cutter bar is made up of two sections shaped like squat "T's," which are welded together to form an "H." The stems are made with rolled-in weld bevels, eliminating a costly machining operation.

Through the years one of the best known and most important uses of special sections has been



TWO special sections provide strength without bulk for this galvanized pole line cable clamp.



THIS shape replaces a forging, permits economical output of trunnion bearings on screw machines.

for automobile and other vehicular tire rims and side rings. These critical parts have been designed and rolled with extra steel at points of stress, thus providing needed strength. Specially rolled rims and side rings are still widely used for trucks, tractors and other heavy equipment.

Tractor shoes also, are now frequently made from special carbon bar sections which provide the necessary strength and toughness at lower cost than forgings. Other applications for special sections include a trunnion bearing and a mine roof support clamp. In both cases substantial savings were achieved by rolling rather than forging the desired shape prior to finishing operations.

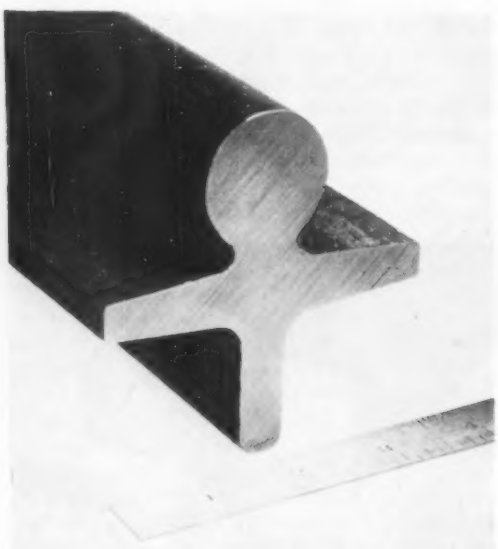
Sections are light, strong

Pole line hardware (guy wire and cable clamps), and automobile door hinges are typical of products where special sections may offer a stronger, lighter and less bulky product than castings.

Example of parts formerly fabricated from strip but now made from special sections include stronger, more rigid blades for reel and rotary-type lawn mowers. Rolling-in the cutting edges reduces expensive machining and grinding operations.

Similar applications include cutting edges and scraper blades for earth moving equipment and tines for farming and gardening tools. Sections for such parts may be rolled with single or double bevels, flat or curved.

One manufacturer, who formerly produced cutting edges by flame cutting bevels on plate, now reports using a special rolled section. It weighs only 29 lb per ft, compared with 34 lb per ft for the plate. The lower weight section actually costs less than the plate, also yields extra savings in shipping and handling. Of course, the costly flame cutting operation is eliminated, as is the scrap loss.



VERSATILITY of rolling technique led to design of this railroad brake beam component.

Another firm uses a large tonnage of serrated (scalloped) edge flats in various sizes for catwalks on freight cars. The special section edge, which is slip resistant, was formerly punched, a costly operation.

Split rings of approximately 4-in. diam made from special sections are widely used in constructing timber trusses. One ring plus one bolt is said to replace from four to five bolts. Originally these rings were formed from strip, then from beveled flats. The new section is double wedge-shaped, making a ring that is easy to install, with a very tight fit. Machining the bevel would entail excessive cost.

Another special section, consisting in effect of a round bar connected to a "T," is used in manufacturing solid truss railroad brake beams. The bar is cut on a line with its length, separating the round from the tee in the center portion, but leaving it uncut at both ends.

Upsetting forms truss

The part intended for the compression member is shortened by upsetting, causing it to move outward and form a truss. The extended truss ends are then forge-flattened to a correct size to receive the wear plates and brake head. This truss has been used successfully for many years. It is considered stronger, more durable and safer than bolted trusses.

Needing a small rail for an overhead conveyor system, one manufacturer took a standard beam, slit it along the web, removed the necessary amount of metal, and rewelded it. This expensive, wasteful procedure produced a rather unsightly rail. It was also difficult to bend, due to the weld seam. A neater, much less expensive special section solved this problem.

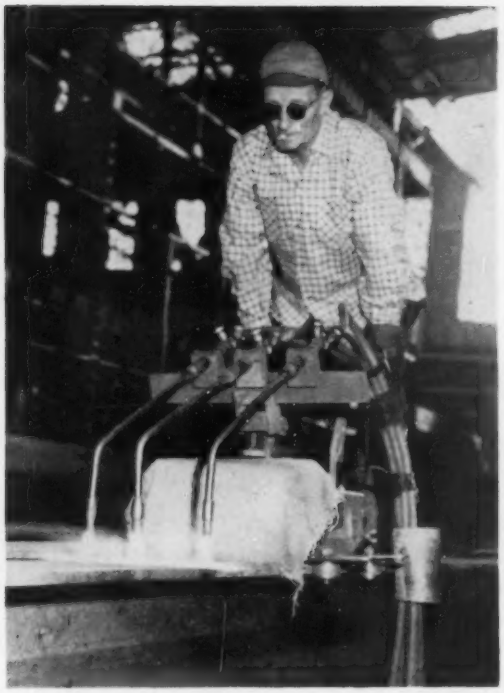
Many special sections give the customer exactly what he wants—in fact, what may be difficult to get any other way. Illustrating this point are the main supporting members for open-type gratings, bridge flooring systems and flooring panels to be filled with concrete. These floor systems weigh less than other types, are easy to install and maintain, have the added advantage of rigidity and resistance to impact.

Large lock washers, used mainly in railroad track work, are made from alloy special sections of precise keystone or bread-loaf shape. These shapes provide the extra metal needed to form parallel sides as the bars are bent into rings. The washers could be made by forging or cold-drawing standard bars, but both are costly methods.

An interesting new development is a double-bulb section designed for use as curb facing in street construction and repair. It is used in place of poured concrete, granite or stone curbing. Concrete poured behind the facing and the double-bulb section shields the curb from damage.

Cambered within tolerances—

Torch Rig Cambers Structurals To Shape



TORCHES on self-propelled dolly heat 100-ft beams, deliberately induce up to 6-in. camber.

◆ FLAME CAMBERING introduces a flexibility into shop and field fabrication difficult to achieve otherwise. It involves deliberate distortion by heat, so controlled as to permit prediction of the arching within ¼ in. Structural steel undergoing such treatment may run up to 100 ft long. While cold bending will do the job, shop equipment generally cannot handle such large sections.

The flame cambering technique can find use wherever steel beams enter the construction picture. Applications include beams used in bridge, tower, ship and other structural work. At New York Shipbuilding Corp., Camden, N. J., the concern is highway bridges.

Compensates for deflection

Camber in a beam describes a rising or convexly-upward curvature introduced during fabrication. Arching of the beam functions principally to compensate for beam sag or deflection under its own weight and any loads carried.

To determine the amount of camber desired in a beam, consider first the effect of later welding operations. If they seem likely to redistort the cambered beam into a new attitude, introduce any necessary corrective factors.

Required camber can vary from less than one inch to six inches. This in beams running from 40 to 100 ft long. The curvature induced by heating sometimes must leave a substantial amount of camber after deflection of the beam under load. Typical of this last situation is the sizable cambering required of a beam that follows the rapidly rising and falling contours of a bridge roadbed.

At New York Ship, flame cambering is accomplished with an Airco traveling carriage mounting three torches fitted with special heating tips. The carriage rides on top of the flange as the beam sits upright. It moves continuously at controlled speed over the area specified.

Progressive heating speeds of 11 to 26 ipm produce the desired curvature. Two runs in this speed range generally are best.

It's normally necessary to induce a beam rise under heat two to three times greater than the camber desired. Total rise of the heated beam can serve as a guide to the approximate camber that will finally result on cooling. Camber accuracy can be maintained within ¼ in.

Temperatures on the flange vary from 250° to 300°F. Holding temperatures below 300°F avoids undesirable changes in the metallurgical structure and physical properties of the workpiece.

In operation, an asbestos baffle mounts in front of the self-propelled carriage to insulate the machine from heat. An asbestos cloth supplements the baffle to provide additional heat protection and to avoid entrance of scale particles into the machine.

Final camber is measured only after complete cooling of the beam. Experience in adjusting speeds will permit cambering beams successfully on the first run, in some cases.

Ten-minute checkup—

Etch Penetrant Pinpoints Casting Surface Defects

◆ What constitutes 'aircraft quality' in castings? . . . Opinions differ, but in magnesium castings, everyday major defects are those largely responsible for service failures . . . Defects of this nature usually surface.

◆ So Sikorsky Aircraft set about developing an improved, 100 pct inspection with etch penetrant technique . . . Part of a 100 pct inspection on critical parts, method is applied at foundry level . . . Test takes 10 minutes.

By G. TYLER, Materials Engineer, Sikorsky Aircraft Div., Bridgeport, Conn.

◆ GROSS DEFECTS in magnesium castings are boldly revealed—even under normal shop lighting conditions—by a quick, etch-penetrant inspection technique. The process uses three acid baths, and takes only 10 minutes from start to finish. It spots such everyday defects as cracks, cold-shuts, oxides and heavy shrink.

The technique was developed by Sikorsky Aircraft Div. of United Aircraft, Bridgeport, Conn. The firm uses it as part of a 100-pct inspection program for all critical castings, and applies it at the foundry level to avoid unnecessary handling or processing of defective parts.

Defects show up plainly as an amber bleedout against a white background.

Defects usually surface

Sikorsky went to work on development of the method in 1954, because of a confusion of opinion as to just what constituted proper aircraft quality in magnesium castings. It felt it was rejecting some castings from the foundry which could have been used. Conversely, it felt the foundry was shipping some castings as supposedly sound which Sikorsky felt weren't really up to snuff.

From experience, Sikorsky knew that service failures in magnesium castings stem primarily from the everyday gross defects, which will usually surface. True, you can have microshrinkage buried in a wall, but if it's heavy enough, it will surface on one side or the other or show all the way through.

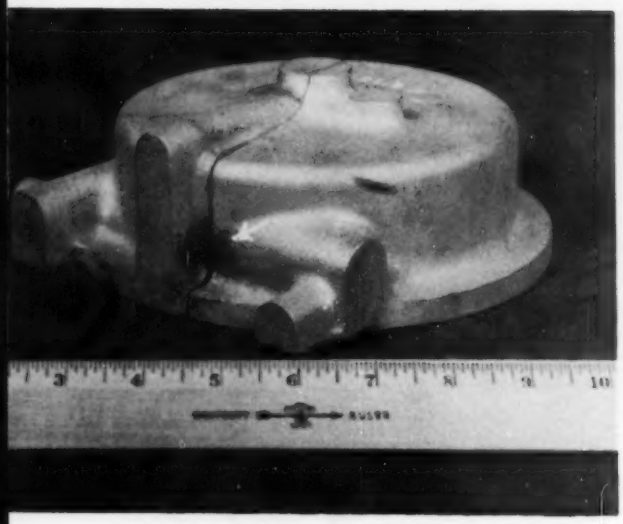
Since a 100 pct inspection of critical parts was always necessary, Sikorsky decided some sort of 100 pct visual type inspection would be best—if some reliable means for uncovering and exaggerating defects so they could be seen could be developed.

For some time, the foundry had been etching shot-blast-cleaned castings in an acid bath. Government specifications on the castings called for removal of 0.002 in. from the surface by immersing castings in a 4 pct sulphuric acid solution. They felt this etch would uncover any surface defects. A chemical bleedout which

Major Defects Shown Up:

- Cracks
- Seams
- Porosity
- Cold Shuts
- Oxide Inclusions
- Shrinkage

TRIED on all these different types of casting defects, etch penetrant has proved a fast and reliable inspection method.



MICROSHRINKAGE defect in this casting was revealed by etch penetrant inspection. Casting is cut through to show depth of the defect.

would have good contrast with the etched surface would then make the defects readily apparent to the inspector.

Laboratory testing on this project evolved from efforts to remove the black smut left on the casting surface from the reaction in sulphuric acid. This was accomplished with hydrofluoric acid. A third bath, a mixture of chromic and nitric acids, then was used to produce the desired bleed-out.

Thus was developed the complete process which Sikorsky first called Acid-Etch and later, Etch Penetrant Inspection.

The company felt that this method of inspection embodied the fundamental principles: exaggeration by etching, contrast by penetrant bleed-out, permanency of indication and natural light visual examination. After development, it was tried on all of the different types of casting defects, with excellent results.

Guides foundry practice

There were several reasons for installing the method at the foundry level. For one thing, casting defects are often inherent in a casting shape. That is, such defects as oxide and microshrinkage, foundry practice remaining constant. tend to appear in the same location throughout a casting lot. Thus, defective practice must be caught and remedied early to prevent tie-ups in production schedules while bad castings are returned and technique is changed.

Another advantage is that etch penetrant inspection can point up defects difficult or impossible to detect by other methods.

In radiographic inspection, casting configuration is a critical factor. The sloping change in section in a radius area, difficult to cover by radiography, is also usually an area of high stress concentration, where close inspection is required. X-ray also has its short-comings in detecting oxide skins, and such defects as ragged, intergranular hot cracks are sometimes missed by X-ray unless the plane of the crack is predominantly parallel with the X-ray beam.

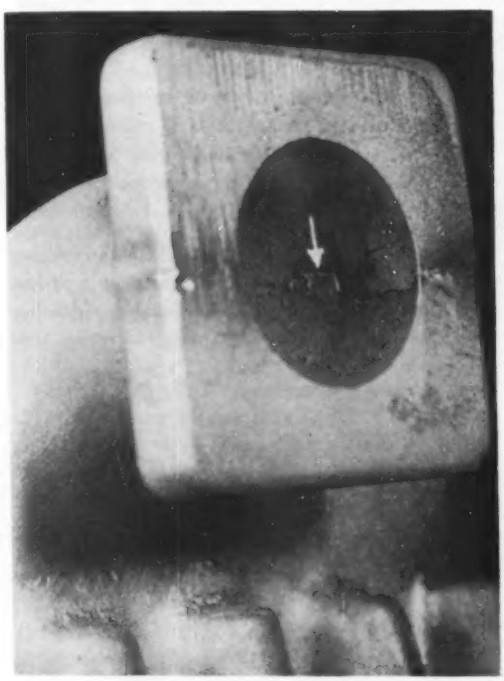
Each penetrant inspection has an advantage over fluorescent penetrant inspection as well. Working in semi-darkness and using black light, the inspector's job is made more difficult by extraneous false indications caused by foreign substances adhering to casting surfaces and by indications of nicks and scratches.

Since it can be performed under normal lighting conditions, etch penetrant inspection permits casting quality to be reviewed not only by the inspector, but by anyone else.

Any of the false indications which can throw inspection off are removed in the etch.

Sikorsky's laboratory has run many comparison tests between these tests, and finds etch penetrant the more reliable and efficient inspection process for finding surface defects. On many occasions, it has turned up cracks and extensive oxide skins not indicated by either X-ray or fluorescent penetrants.

Initial scrap rates at the foundry will probably run higher with production use of etch penetrant inspection. But in working with the process the foundry's scrap rate should decrease, in the long run, because it can remedy defects earlier.



OXIDE SKIN in this casting was brought sharply to inspector's attention by etch penetrant.

Up to 800°F—

Magnesium Alloy Moves Temperature Barrier Upward

DRAWABILITY of magnesium-thorium alloy sheet compares well with other magnesium alloys.

◆ Top service temperature not so long ago for magnesium and its alloys ran only a few hundred degrees . . . Now a thorium-bearing magnesium alloy exhibits acceptable tensile properties up to 600°F in extended service, 800°F in short exposures.

◆ The new alloy can be readily stamped, drawn and welded . . . Developed for aircraft use, it has also attracted the interest of designers in other fields.

By R. E. BOCKRATH,
Development Engineer,
Magnesium Technical Service
and Development Dept.,
The Dow Chemical Co.,
Midland, Mich.

◆ DESPITE a favorable strength to weight ratio, limited performance at temperatures greater than 300°F has restricted past usage of magnesium alloys as structural metals. Now the family of thorium-bearing magnesium alloys has increased the usefulness of these low density materials.

Extended service at temperatures up to 600°F has negligible permanent influence on their mechanical properties. The same applies to short time exposure at higher temperatures.

In continuous service beyond 500°F, mechanical properties of the magnesium-thorium alloys compare favorably with those of other materials. They can be superior on a strength/weight or stiffness/weight basis.

Continuously exposed to temperatures up to 600°F, these alloys retain a sizable fraction of their room temperature tensile and yield strengths. Short time properties (see Figs. 1 and 2) naturally show up even better.

In terms of tomorrow's equipment, this means better performance or greater usefulness per pound of weight. Use of such alloys in powerplants or adjacent areas can reflect itself in

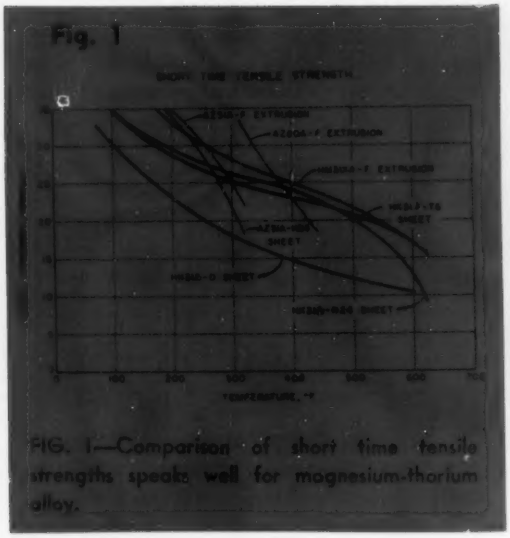


FIG. 1—Comparison of short time tensile strengths speaks well for magnesium-thorium alloy.

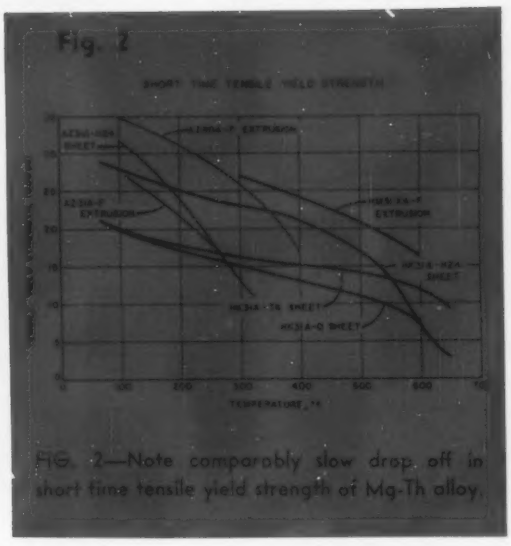


FIG. 2—Note comparably slow drop off in short time tensile yield strength of Mg-Th alloy.

increased payload, reduced power requirements, greater part stiffness and higher engine speeds. All these benefits apply, potentially at least, to not only aircraft but also earthbound vehicles: Those engaged in transport, construction and agricultural activities, for example.

In addition, a host of isolated applications are conceivable. In a number, it's been tacitly understood that only a temperature limitation restrained designers from shifting to a lower weight material long ago.

One of these magnesium-thorium alloys, HK31A, has been marketed. At present restricted to defense applications, it's now in production for such end uses as supersonic aircraft and missiles. There the material finds use not only in airframes, but also in radar and electronic apparatus.

Light weight is advantage

As with the other magnesium alloys, light weight is the outstanding property of HK31A. Specific gravity of the alloy is 1.80, compared with 1.74 for pure magnesium.

HK31A sheet and plate can be had on normal mill schedules in thickneses from 0.016 to 2 in. Mill stock is finished either to —H24 (half hard) or —0 (fully annealed) tempers.

Table I details the effect of elevated temperature exposure on the properties of HK31A-H24 sheet in thicknesses of 0.040 to 0.250 in. This table may be compared with the curves of Figs. 1 and 2.

Finished parts can be solution heat treated and aged to the —T6 temper, if desired. This calls for solution heat treatment at 1050°F for one half hour, followed by aging at 400°F for 16 hours.

Sheet stiffness can be boosted by increasing metal thickness. This need not involve a weight penalty. The alloy maintains a high modulus of elasticity at elevated temperatures. (See Fig. 3.) Measured against the yardstick of a previously used material: Over a wide temperature range, either increased stiffness with equal weight, or equal stiffness with less weight, or a combination of both, can result with HK31A.

This property can prove valuable in some areas of structural design, including transportation equipment. Aircraft builders, for example, find stiffness an answer at times to wrinkling and buckling troubles. Formation of ripples or buckles on the airframe surface can seriously affect aircraft performance at high speeds. It results in turbulant airflow, which reduces speed and causes added stress on the material.

Therefore, in structural design, buckling strength can enter as an important consideration. With structures subjected to compressive loading, it's important to select materials possessing high resistance to buckling. In aircraft, to cite an instance, an estimated 60 to 90 pct of the structures undergo compressive loading.

Since many such structures are fabricated from flat sheet or plate, it's possible to compare performance on the basis of single plate elements. Consider the top skin of an aircraft wing, compressively loaded while in flight. A portion of this skin can be analyzed as a simply supported plate undergoing compressive loads. Table II compares the critical buckling stress of simply supported 10 in. wide plates.

Metals considered are the best for the conditions and temperatures covered in this example. Those examined include HK31A-H24 alloy, a high strength aluminum alloy, and a 4 pct Al, 4 pct titanium alloy.

Fig. 3

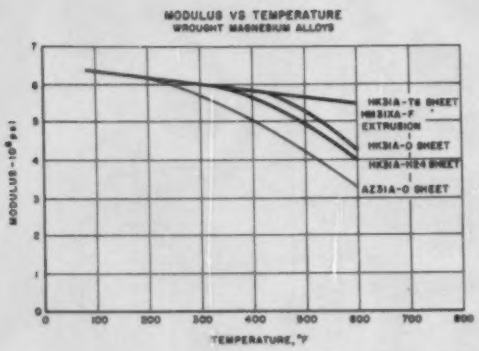


FIG. 3—In —T6 temper, Mg-Th alloy exhibits a relatively stable modulus of elasticity.

Fig. 4

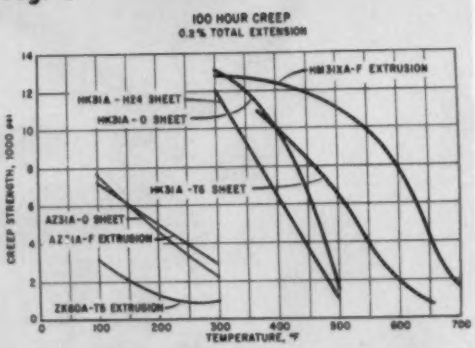


FIG. 4—Creep strength at elevated temperatures shows dramatically, compared to AZ31A sheet.

Fig. 5

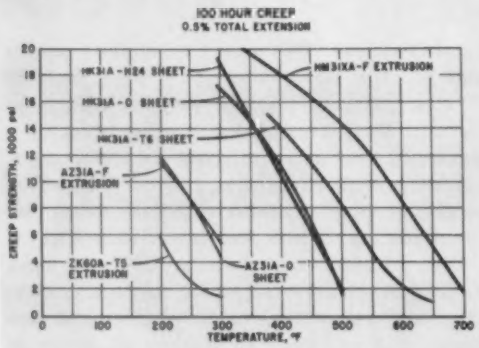


FIG. 5—Again, —T6 temper outperforms —H24 temper in 100 hour creep strength tests.

Fig. 6

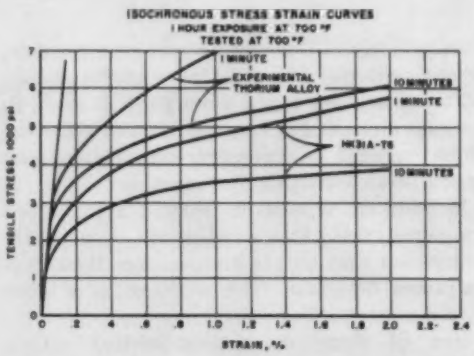


FIG. 6—Toughness of alloy may be represented by area beneath stress-strain curve.

All plates are assumed to be under 50,000 lb compressive loading, free of buckling. Under these conditions, relative weights at 400°, 500°, and 600°F are shown. HK31A-H24 alloy is superior under short time loading at 400° and 500°F, and equal to the experimental aluminum alloy at 600°F.

The thorium-containing magnesium alloys possess excellent creep resistance (Figs. 4 and 5). This property with low density has encouraged solution of weight problems associated with high temperature and stress.

Resists fatigue well

Fatigue stress levels of HK31A fall somewhat below those for AZ31A magnesium alloy at room temperature. At elevated temperatures, however, HK31A retains a high ratio of fatigue stress to static strength. This ratio at elevated temperatures compares favorably with that of magnesium alloys at room temperature.

Toughness has proved increasingly important in recent years in some areas of structural design. Toughness is a measure of the material's ability to absorb energy before fracturing or suffering undue deformation. It is usually represented by that area lying below the material's stress strain curve (see Fig. 6).

At room temperature, toughness of HK31A is slightly lower than that of AZ31A sheet alloy. Test values fall within the lower AZ31A-H24 scatter band. Since toughness increases with temperature, no problem is anticipated.

Machinability of the magnesium-thorium alloy is excellent, like that of conventional magnesium alloys.

Studies on the deep drawability of HK31A-H24 sheet indicate that a 650° to 700°F temperature range enables maximum reduction of area in a single draw. This maximum area reduction of 67 pct compares well with that of AZ31A-O magnesium alloy.

Both —0 and —H24 tempers of HK31A draw readily on production equipment of the type normally used for commercial magnesium alloys. Reductions of 40 to 60 pct have been achieved with drawing speeds of 6 to 10 ipm on standard equipment. Die temperatures averaged 600°F with the —0 temper, and 700°F with the —H24 temper alloy. Punch temperatures seem best between 450° and 500°F for the —0 temper, and 550° to 600°F for the —H24 temper.

Cold cracking failure will occur if parts are formed at too low a temperature. Hot cracking takes place where forming temperature is too high.

Weldability is one of the outstanding characteristics of HK31A. Because of its freedom from cracking, it can readily be arc- or spot-welded.

Arcweld efficiencies of 85 pct are obtained with HK31A-H24 sheet at room temperature. Tensile strengths range from 31,000 to 34,000 psi with the weld bead left intact. After grinding the bead flush, values run approximately 1000 psi lower.

At elevated temperature, weld strengths do not differ significantly from those of the unwelded sheet. For example, weld efficiencies rise to 100 pct at 400°F.

HK31A responds to both dip and anodic-type chemical treatments in much the same manner as do other aluminum-free magnesium alloys. Of the five treatments outlined in specification MIL-M-3171A, four can be applied to HK31A: types 1, 2, 4 and 5. MIL-M-3171A, type 3 is not recommended for this alloy. The coating thus produced is too thin for proper paint adhesion.

Dow 17 finish has proved most effective on both painted and unpainted HK31A surfaces. Both HAE and Manodyze treatments can be used satisfactorily.

In rural exposure tests, untreated panels of bare HK31A sheet show no evidence of stress corrosion failure despite loading to 90 pct of tensile yield strength. Panels have been under test for more than two years.

Table I **Effect of Elevated Temperature on Properties of HK31A-H24 Sheet**

Exposure		Test temp.	Pct elongation	Tensile yield strength (x 1000 psi)	Compressive yield strength (x 1000 psi)	Tensile strength (x 1000 psi)
°F	Hours	°F				
300	0	70	8	29	25	37
	5000	70	8	29	25	37
400	5000	70	8	29	25	37
500	500	70	11	29	24	37
	1000	70	15	29	22	37
	5000	70	16	28	21	36
600	½	70	9	29	25	37
	1	70	11	29	24	36
	100	70	20	27	19	36
	500	70	21	26	18	35
	1000	70	21	25	18	35
	5000	70	20	23	16	34
650	5 min.	70	11	29	24	36
	¼	70	11	29	24	36
	½	70	11	29	23	36
700	5 min.	70	8	29	24	36
	¼	70	12	29	22	35
	½	70	14	29	21	35
	1	70	18	29	21	35

Table II **Comparison of Critical Buckling Stresses**

Temperature, °F	Critical buckling stress, psi	Thickness*	Relative weight
400			
HK31A-H24	16,800	0.298	100
2024-T4	20,000	0.250	127
RC-130A	23,800	0.210	181
500			
HK31A-H24	15,500	0.322	100
2219-T6	19,000	0.263	124
RC-130A	23,800	0.210	168
600			
HK31A-T6	11,000	0.455	100
2219-T6	17,000	0.294	98
RC-130A	23,800	0.210	119

* Thickness is the dominant factor in stiffness

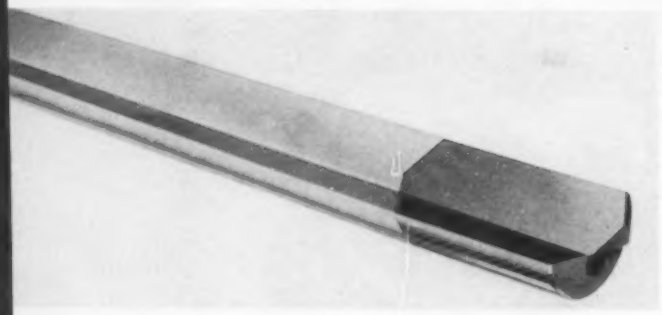
No radioactivity hazard

Thorium is a slightly radioactive material. But it is present in such small quantities in HK31A that the alloy is not hazardous to work with. In grinding, the normal dust control precautions followed with standard magnesium alloys will avoid formation of toxic concentrations of thorium dust. In welding, good exhaust ventilation or use of a ventilated welder's hood suffices.

Because of its radioactivity, Atomic Energy Commission controls use of thorium. This means fabricators of HK31A alloy must be licensed. Licensing is no problem, if the material is to be used in a defense application.

Besides sheet and plate, magnesium base thorium alloys also are available as sand castings. Studies now in progress will determine the alloy's suitability for extrusion, forging and diecasting.

Minimum mechanical properties recently set for HK31A-H24 include values of 34,000 psi tensile, 26,000 psi tensile yield, 20,000 psi compressive yield, and 4 pct elongation in 2 in.



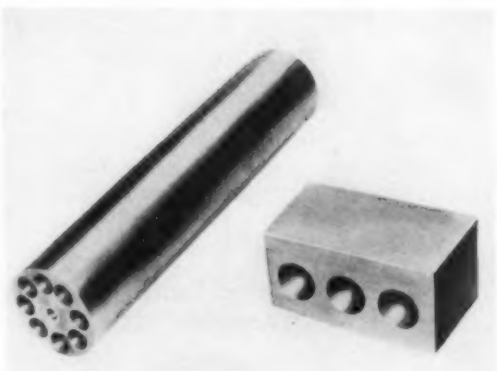
Drill deeply, accurately—

Convert Standard Tooling For Low Cost Gundrilling

◆ Gundrilling can answer your precision hole drilling needs . . . And there's no cause to invest in costly equipment of special design . . . Frequently, standard shop machine tools can be converted.

◆ Look over your milling, boring and drillpresses, your planers and lathes . . . Chances are good that you can convert them at low cost to meet the rigidity, speed, feed and alignment requirements of gundrilling.

By F. S. BLOCH, President
Eldorado Tool and Mfg. Corp.,
Milford, Conn.



◆ GUNDRILLING, a precision technique long known to machine shops, shows signs of a comeback. Reason for this involves a clearer understanding of the fact that gundrilling need not necessarily call for costly equipment of special design.

Any machine that meets rigidity, speed, feed and alignment requirements can be used for gundrilling. This includes machines especially designed for deep hole boring and precision boring machines converted for gundrilling. It also covers a wide variety of standard lathes, milling and boring equipment, power feed drillpresses and turret lathes. Some very satisfactory current production gundrilling operations employ everyday shop equipment modified at significantly low cost.

Way-type units and self-contained drillheads can convert economically to quality gundrilling machines. They provide considerable freedom in mounting and drilling the workpiece. For multiple holes parallel or at angles to one another, such equipment has proved particularly suitable.

In gundrilling, one question is whether the work or drill is to be rotated. The answer depends on the hole length, and the symmetry and size of the work.

With holes over 50 diameters deep, it should be more economical to turn the work, if this is feasible. Spinning the work makes possible higher cutting speeds.

For holes less than 30 diameters, it's usually less expensive to turn the drill. This holds true even if the work itself can turn. Use of a stationary fixture holding the workpiece can reduce loading time.

It's permissible to feed either drill or workpiece, regardless of which rotates. Choice depends almost entirely on the machine selected.

As a rule, the gundrill bushing should firmly

contact the work. It should also form part of the machine setup, not the fixture. At times, neither condition can be observed. But don't discard the idea of gundrilling just for this reason. Jobs have been drilled with space between the bushing and the work. In special cases, the bushing even rotates with the drill.

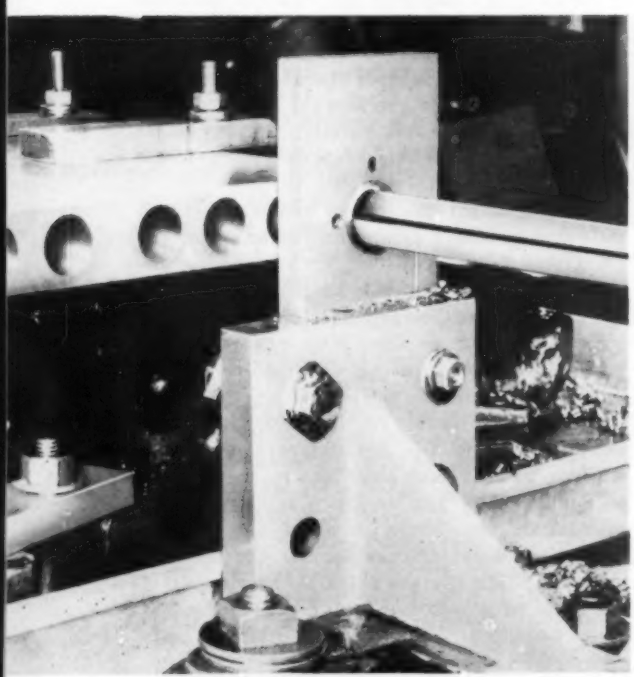
Where correct spindle speeds cannot be attained directly, several alternates present themselves. Consider first rotating drill and workpiece in opposite directions. Specifying a drill speeder or sub-spindle may be feasible.

If the feed system does not connect directly to the spindle, take care that the spindle reaches full speed before drilling starts. Make sure also that the spindle does not slow down during drilling from slippage or motor overload.

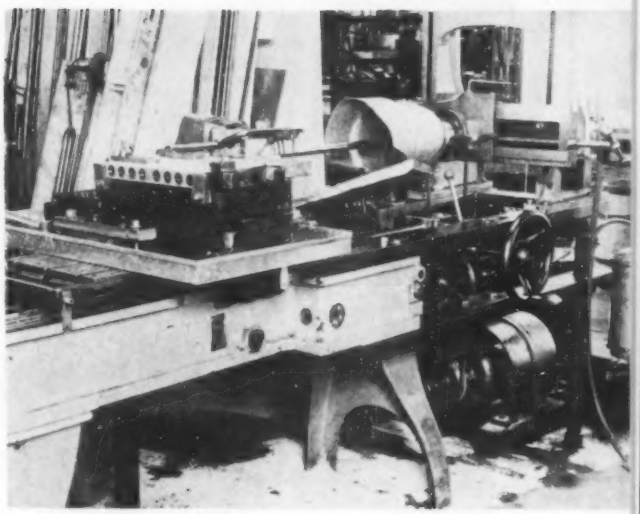
Feed systems may be driven and/or controlled mechanically, hydraulically or pneumatically. If mechanical, the system may drive through screw, rack and pinion or cam mechanisms. Screw feed systems usually require manual return. Hand feeding is not suitable for gundrilling because of the difficulty in maintaining an even feed rate.

Mechanical systems must incorporate a high degree of rigidity. Backlash can be eliminated by spring loading, or by an even friction drag at the feed carriage.

Hydraulic feed units provide the advantage of easily adjusted feed rates. But make such adjustments after the system comes up to operating temperature, unless it provides for automatic temperature compensation.



SIMPLE jig guides gundrill accurately in multiple deep hole drilling on converted planer.



CONVERTED planer gundrills precisely. One motor drives both spindle and gearbox.

Consider the benefits of rapid return feed on cam-and-piston-driven feed mechanisms. Such a setup can pay off in high volume production situations. Rapid skip feed can prove particularly valuable with interrupted or "piano hinge" type drilling operations: Where open space separates a series of coaxial holes, prefer a feed that traverses the gaps quickly.

Spindle end play and slack in the feed mechanism must be eliminated in gundrilling conversions. Both seem particularly common in drillpresses, and can cause the gundrill to jam and break. Lateral play in spindle quills should be reduced to a minimum to maintain hole size and straightness.

Use rigid fixtures

Parts requiring more than one gundrilled hole must be considered special cases. Design fixtures and setups securing such workpieces for close alignment and high rigidity.

Use of the drill and bushing to align the work is common jigging practice today in twist drilling on radial and multiple spindle drillpresses. This technique definitely is unsuitable for gundrilling. Accurate fixture indexing must be used for both single and multiple spindle gundrilling machines.

The fixture can index in front of a single spindle. If hole spacing permits, multiple spindles can mount side by side or at any angle to each other. For closely spaced holes, multiple spindles and an indexing fixture can work together.

Alternately, holes can be drilled from opposite ends. With this last, two setups are possible. First, drillheads may move to the workpiece simultaneously. Or the fixture may feed first to one spindle, then to the other.

Ways-and-means talk—

Handle Chips Efficiently For Greater Shop Profits

Part I

◆ Salvage value is one obvious reason for handling metal chips and turnings . . . Probably a more impressive economic argument is savings won by minimizing degree to which they clutter up the place . . . Inefficient removal costs money.

◆ Handling efficiency involves both headwork and hardware—know your problem, then select the best equipment and method for handling it . . . Here are the practical means shops have found for handling problems of chip disposal.

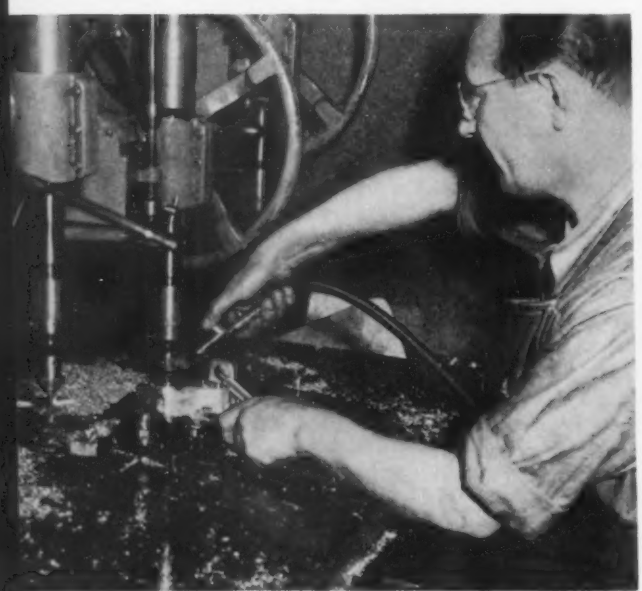
By J. E. HYLER, Consultant, Peoria, Ill.

◆ SALVAGE VALUE is one obvious economic justification for handling metal chips and turnings. But if all economic aspects were considered, it would probably turn out that the production savings realized by getting them out of the way expeditiously, so they don't clutter up machines and slow operators, would show almost as great a profit.

It's precisely because poor removal methods cost money that a clear understanding of the principles behind efficient chip handling becomes important to metals shops.

The chip handling problem obviously differs with different machines. With some (particularly those incorporating work tables), intermittent air blasts can be set up to whisk troublesome chips out of the work area. This can be automatic. In other instances, it's worthwhile to have at hand some manual means such as a good blow gun or air nozzle on a compressed air line. These are often used.

Another consideration besides the kind of machine producing the chips is the number of machines in a battery and the total volume of chips produced. With a large gang of auto-



Binks Mfg. Co.

DRILLING MACHINE operator uses efficient blow gun to clear chips from immediate working area.

This is Part I of a five-part series. Subsequent articles will deal with various methods applied in the handling, processing and disposal of chips and turnings.

Chain Belt Co.

TROUGHED BELT conveyor handles chips and turnings in plant of Chain Belt Co., Milwaukee.

matic bar machines, for example, some sort of continuous conveyor might offer most efficiency.

Special chip pans are another example of the various types of equipment available for chip handling. Mounted on casters, these can help greatly in keeping floors clean around some types of lathes and other machines.

In many places, power lift trucks play an important role in carrying and dumping bins of metal chips and turnings. Bins are placed and filled from strategic points next to the machines requiring clearing. Sometimes, trucks are provided with revolving fork attachments, allowing them to pick up, carry, elevate and dump such bins of metal turnings.

Self-dumping hoppers are another useful device. Used with power trucks, these make it practical to carry chips and turnings to railway cars or to other points. They're left stationed at the various machines until they've accumulated enough turnings and chips to make lift-truck removal and disposal necessary.

Magnets for ferrous chips

Where the volume of chips to be transported is much smaller, box-type skids may be used.

A small, magnet-supporting boom substitutes for the fork on power trucks sometimes. The magnet can be maneuvered to pick up the chips, carry them to a railway car or some other disposal point and drop them.

So much for chips which can be directly removed and disposed of. In many cases, processing of chips and turnings will be desirable, for salvage, cost, or other reasons.

Firms generating a considerable volume of chips and turnings often install crushers and oil extractors. Crushing turnings permits the shipping of a much larger volume in a given amount of space. Extracting the oil permits reclaiming a very large proportion of the cutting oil. And the chips, with oil removed, command a higher price.

Where a plant elects to crush metal turnings and run them through an oil extractor, methods used for chip handling will be strongly affected.

Double problem then is getting chips away from machines and to the crusher and auxiliary equipment in the easiest, lowest-cost manner. Greatest possible advantage should be taken of gravity in handling.

Sometimes chips coming from a battery of multiple-spindle automatics may be gathered in collecting pans or bins, then brought by power trucks or other means to a hopper, which drops them into a chute.

If machines served are on an upper floor, this

Automatic Transportation Co.

STURDY BOX-TYPE skids, transported by power trucks, are useful for removing chips, turnings.

is a relatively simple proposition. Even where machines are on the ground floor and there is no basement, it is possible to excavate a pit beneath the floor, in which a primary chip-collecting bin may be installed.

Sometimes drag conveyors in the floor, leading from a machining area to a primary chip-collecting bin, are feasible. In other instances, it may be more practicable to gather most of the chips and turnings in this way, yet to handle a certain amount in portable containers by power truck or monorail.

Where certain machines are located further away from the initial chip-gathering bin than are most of the others, it may be best to bring in the relatively small volume of chips and turnings involved by cart or wheelbarrow.

Conveyorized chip discharges are being used more and more with large batteries of automatics and similar machines. Sometimes an apron conveyor is employed. In other cases a troughed belt conveyor is used. Obviously, belt conveyors for handling oily chips must be constructed to withstand the action of the coolant. Sometimes floor-channeled drag conveyors work well.

One highly-interesting arrangement sometimes found consists of a special pan conveyor. Quite low and horizontal at the receiving end, this is used to receive chips or turnings from a battery of metalworking machines. Near the delivery end it takes an upward direction climbing to a height sufficient to permit it to discharge through a swivel spout to different box trucks or containers.

This is particularly useful where chips and turnings must be brought from a relatively "tight" location out to where they can be placed in containers with less difficulty.

Separate stray parts

Many times, chips coming from a battery of automatic screw machines have a certain number of parts mixed with them, and possibly a considerable number of rod ends. Most crusher installations automatically eject any large pieces of steel. Still, separation operations are often carried on.

Sometimes a unit built like a fanning mill or sawdust separator (such as is used to separate sawdust from plated parts after tumble-drying) is used for separating screw machine chips from workpieces.

Where there are large volumes of screw machine work, it is often considered highly important to use a separating machine.

In plants where smaller volumes of work are handled, solid parts may be picked out. Mixed parts and chips can also be handled in riddles or over special screens. Vibrating screens can be used if desired.

Very often, chips and turnings from screw machines or similar units are carried directly by conveyor to a work separator. A typical chip separator, specially built, will handle as much as three men with riddles or six men simply picking out parts and rod ends from chips. Some separators operate at as much as 99 pct efficiency, even when mixed-in workpieces are very small.

The chip separator incorporates a hopper into which mixed parts and chips are fed while the machine operates. Hopper angle adjusts to control the rate at which parts and chips gravity-feed into an air blast. Vibration also helps provide even feeding.

Volume of the air blast can be controlled by a gate on the blower intake. This controls velocity of air at the discharge of the fan and consequent strength of the air stream. The air stream separates parts and chips according to their difference in weight.

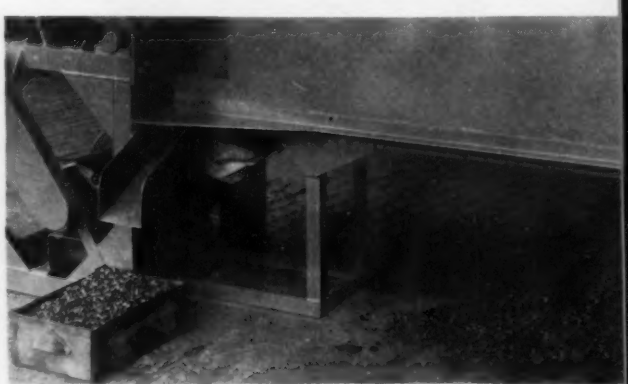
Part size counts

Chip separators are doubtlessly more important as parts produced at screw machines or similar units become smaller. Where workpieces are larger, bar ends are also larger and become much easier to pick out.

One interesting aspect of chip-handling systems as installed by one firm is their inclusion of an uncrushed turnings pan. This is just ahead of the crusher feed box.

This pan has several advantages. One is its sloping-bottom design, which permits oil to drain from turnings while they remain in the pan, pass to one end and go on through a perforated plate into an oil drainage pocket.

Usually a dirty oil sump is provided on a floor level below. Thus gravity causes a large part of the coolant to drain directly from the uncrushed turnings pan. In addition to this, however, the uncrushed turnings pan provides an area where turnings can be pulled apart to some degree, allowing an operator to sort out bar ends or other foreign objects.



Ransohoff, Inc.

CHIP SEPARATOR separates turnings from small screw machine parts, discharges them separately.

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New Technical Literature:

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Lithium compounds

"Chemical and Physical Properties of Lithium Compounds" is a 40-page brochure covering, in a complete way, exactly what the title implies. Among several compounds mentioned in this booklet there are some which seem to have interesting applications (i.e.: Lithium Citrate as an electroplating reagent, Lithium fluoride as a welding and brazing flux). The data contained in this compilation is, the company believes, as reliable as can be published at this time. Later research is expected to uncover more facts. Hence, this folder is designed to permit addition of new data. *Foote Mineral Co.*

For free copy circle No. 1 on postcard, p. 113

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 113.

Fluid-tight rivets

Design data and installation instructions included in a new booklet cover slug, jacketed and washered fluid-tight rivets. The four-page brochure tells what they are and their advantages. *Pastushin Industries, Inc.*

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Modified balls

Machining methods and materials used for modifying balls are described in a new bulletin. Line drawings illustrate the range and types of modified balls available. These, it says, can be used for valves, gaging, indicator points, burnishing tools, etc. *Industrial Tectonics, Inc.*

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Phano-chargers

Phano-chargers, adjustable self-regulating electronic battery chargers for maintaining storage batteries, are described in a new bulletin. It discusses operation, various customer benefits, and construction. Performance curves and a schematic diagram of the phano-charger are also included. *General Electric Co.*

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Circular saw

Circular sawing machines for ferrous and nonferrous metals are described in new literature. Described as fast and accurate, it says the units are recommended for smaller stock in particular, up to 1¼-in. diam. Smooth, clean, burrless ends reduce and may eliminate secondary operations on cut pieces, it emphasizes. *The Motch & Merryweather Machinery Co.*

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Systems engineering

In a few short years, systems engineering has become a highly specialized business of creating instrumentation for industrial control, chemical analysis, dynamic and static testing, and high speed electronic data processing. A company's catalog explains its services in this field. *Consolidated Electrodynamics Corp.*

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HANDLES COILS FASTER... SAFER

1 Lifter Handles Both Wide and Narrow Coils With Same Speed and Economy

This C-F Coil Lifter, under control of the Crane operator handles hundreds of coils a day in a large mill... wide, narrow, and of varying tonnage. Fast, infinite adjustments of the motorized legs permit quick pick-up and set-down. Legs can be opened to any width and held... no need to open to maximum width to handle narrow coil. Maximum of 12" required between coils of any width—saves storage room.

Positive tong grip on coil tightens as lift is made... insures safe handling. Made in motorized models for crane cab or pendant operation as well as manual types with chain wheel, in capacities from 3 tons up. Powered Rotating Heads available. Opening ranges to suit your requirements. Write for Bulletin and complete information.

CULLEN-FRIESTEDT CO.

1303 South Kilbourn Avenue • Chicago 23, Illinois

Welding

Weldrods are featured in several articles of a new company publication. One describes the role played by overlays and bearings in the operation of the Cheatham Dam gates. Other articles describe the use of spooled wire for fabricating minesweeper manganese bronze hawse pipes; the fabrication of expanding dies for sizing tanks and how drop hammer columns were rebuilt. *Ampco Metal, Inc.*

For free copy circle No. 7 on postcard, p. 113

Fiberglas insulation

Insulations for Lok-Rib steel buildings are fully described in a new eight-page revised catalog. It takes into account changes in design and engineering techniques of Lok-Rib steel building. Included are outlined and diagramed application instruction methods. It says this insulation for walls and ceilings, 1½ in. thick, provides more insulating value than a 12 in. concrete block wall. *Owens-Corning Fiberglas Corp.*

For free copy circle No. 8 on postcard, p. 113

Abrasive products

Abrasive products and electronic formulation are the subjects of printed matter now available. "Electronic formulation," it states, "gives greater accuracy in engineering, in manufacturing, in duplicating orders" of abrasive wheels. Various abrasive products are illustrated and described, including: sheets, rolls, discs, wheels (straight and flaring cup), resinoid disc wheels, cut-off wheels, raised hub disc-wheels and accessories. *Bay State Abrasive Products Co.*

For free copy circle No. 9 on postcard, p. 113

Cupola operation

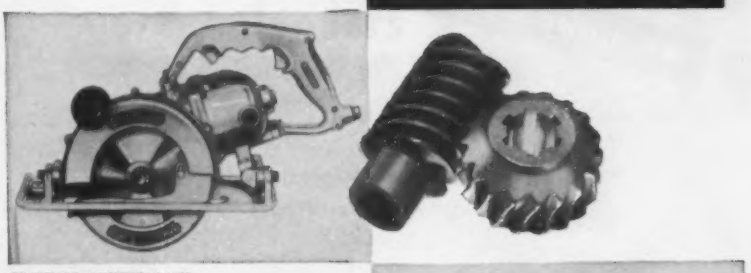
"Fundamentals of Cupola Operation" is illustrated with charts and photos. It discusses factors of cupola operation that affect combustion and melting conditions. Emphasis is placed on the importance of coke quality, material size, stock distribution and "hang-ups." *Whiting Corp.*

For free copy circle No. 10 on postcard, p. 113

Perkins Precision Gears

Custom-Cut

for **STANLEY**



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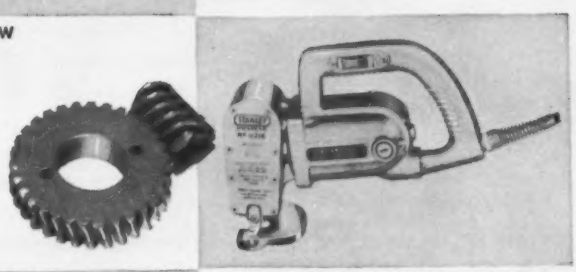

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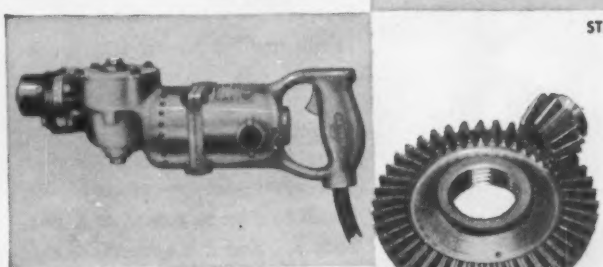


STANLEY HAMMER

FOR YOUR GEAR REQUIREMENTS

Check with Perkins!

STANLEY ELECTRIC TOOLS is a typical PERKINS customer. These Stanley power tools are famous for their quality and durability. For the vital drive elements Stanley comes to PERKINS. We specialize in cutting precision gears to customers' specifications . . . gears of all types, gears of all sizes.

Here is a partial list of what Perkins makes: bevel gears, ratchets, sprockets, ground thread worms, spiral gears, helical gears, spur gears with shaved or ground teeth, in all materials, metallic and non-metallic.

PERKINS MACHINE & GEAR CO.

103 Circuit Ave., WEST SPRINGFIELD, MASSACHUSETTS

35% NICKEL

DURALOY

15% CHROMIUM

Furnace Castings

Here are two good examples of our work in high-nickel castings!

Heat Treating

These are in the Duraloy HT group calling for Ni 33.37 percent. We've gone as high as 68% nickel on some castings where extremely high temperatures and very severe corrosive conditions had to be resisted. The important factor concerning castings for exceptionally high temperatures is that they must retain their structural form under load.

Carburizing

Knowing just how much nickel to put in and how much chromium and other alloying elements depends to a large extent on experience . . . and it is experience that we can offer you for the castings you need. We've been producing static castings since 1922 and centrifugal castings since 1933, being among the pioneer founders in each class.

If you would care to have our metallurgist study your casting problem, we shall be glad to have you call upon us for the service.

Our New General Catalog is yours for the asking.

THE DURALOY COMPANY

OFFICE AND PLANT: Scottdale, Pa.

EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.

DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

CHICAGO OFFICE: 332 South Michigan Avenue

Nuts

"Nuts (Anco-Nuts, That Is)" is the title of a folder pamphlet now available. It describes a line of locking-type fasteners. These have National Coarse, National Fine or Whitworth Threads. They lock and unlock with use of an ordinary wrench, fit any standard bolt, can be applied by unskilled labor and can be used over-and-over again without losing their effectiveness. Pamphlet says they are foolproof, comparable in price to ordinary nuts and lock washers and are "guaranteed to break the bolt in destruction test." *Automatic Nut Co.*

For free copy circle No. 11 on postcard, p. 113

Infrared analyzers

A discussion of the application of infrared equipment to monitor CO, CO_2 or CH_4 content of metallurgical atmospheres is now available in a new folder. It describes continuous measurement of these gas components from the output of endothermic or exothermic generators or in the furnace itself. *Leeds & Northrup Co.*

For free copy circle No. 12 on postcard, p. 113

Platinum lab ware

Standard and special form platinum laboratory ware is described in a recently published brochure. It illustrates standard and special form platinum crucibles and evaporating dishes. *Metals & Controls Corp., General Plate Div.*

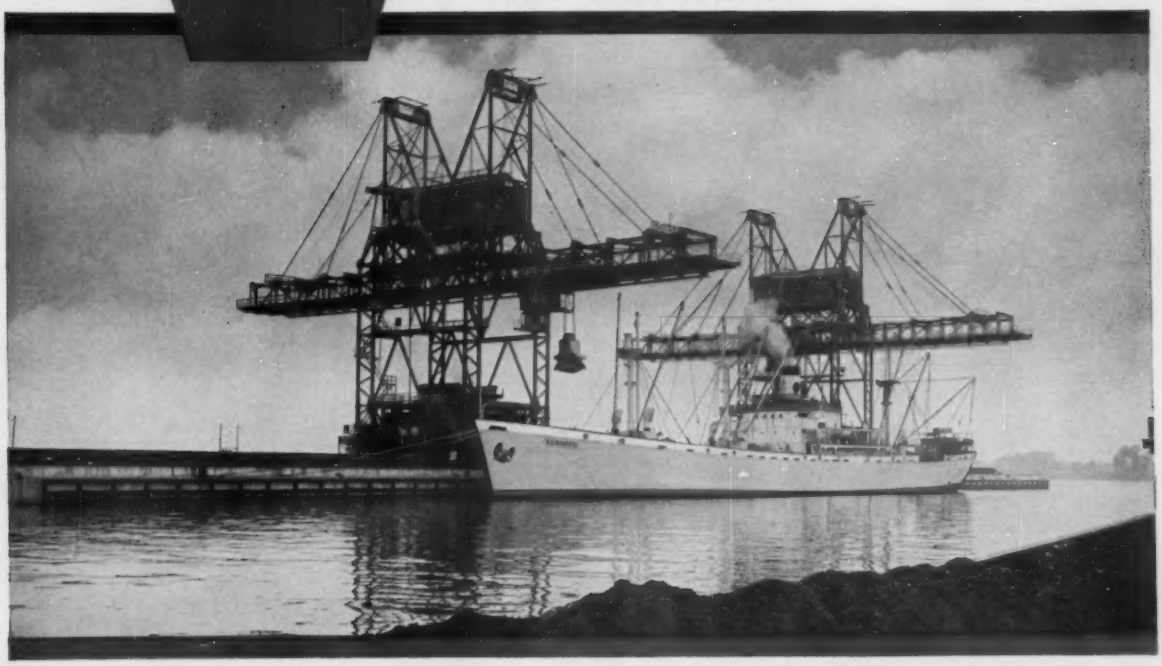
For free copy circle No. 13 on postcard, p. 113

Chain slings

Chain slings and chain sling fittings and accessories are included in a new 42-page catalog. Illustrated with specially prepared drawings and diagrams, it explains terminology of chain slings. These are made from either Republic alloy steel, high test steel, or wrought iron, in single, double, triple, and quadruple types, plus a variety of other standard and special types of slings. The book also includes sections outlining the proper use and care of chain slings. *Republic Steel Corp.*

For free copy circle No. 14 on postcard, p. 113

new Pennsylvania RR pier
handles up to 3600 tons
per hour with **BROWNHOIST**
ore unloaders



60 tons a minute! Seems incredible, but that's the production pace set by these two giant Industrial Brownhoist ore unloaders at the new Pennsylvania Railroad pier in Philadelphia, Pennsylvania. Towering over both pier and ocean-going ore vessels, the two enormous Brownhoist machines—each with a free-digging capacity of 1800 tons per hour—provide this ore terminal with the most modern and efficient unloading facilities in the United States. They can travel the full length of the pier and lower apron extensions from either side to obtain a reach of 72 feet from the dock. Each huge 25 ton capacity bucket rolls out, takes a bite, rolls back on the apron to drop its contents into a 100-ton receiving hopper, then rolls out for another bite. Time elapsed from bite to bite? *Just 45 seconds!*

The same engineering experience that made these Brownhoist ore bridges possible has also resulted in other fine Brownhoist materials handling equipment . . . locomotive cranes, wrecking cranes, car dumpers, traveling bridge cranes, buckets. If you have a heavy duty materials handling problem, it will pay you to discuss it with our engineers at Brownhoist.

BROWNHOIST MATERIALS HANDLING EQUIPMENT
GIVES A LIFT TO AMERICAN INDUSTRY

INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago, Denver, San Francisco, Montreal
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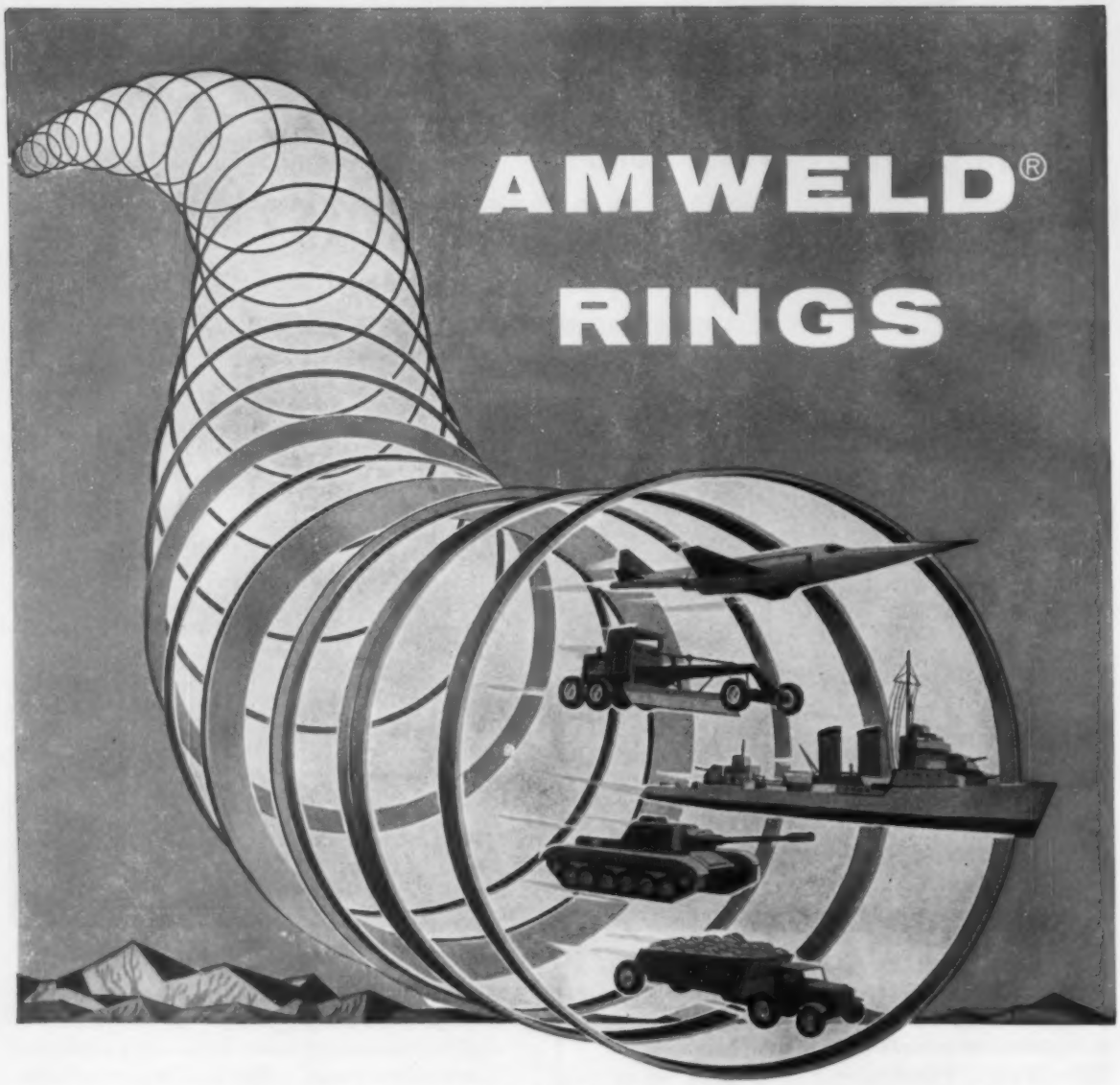
184

BROWNHOIST



. . . part of America's industrial greatness

Send us your blueprint — we will be happy to help on any circular weldment problem you might have.

THE AMERICAN WELDING & MFG. CO.
120 Dietz Road • Warren, Ohio

The manufacture of circular weldments — rings, bands and components — has been an American Welding specialty since 1918.

Since its beginning, Amweld's skills and abilities have kept pace with America's production needs.

In 1949, Amweld was the first to successfully weld titanium alloy on a production basis.

If you need rings or circular components of ferrous or non-ferrous metal, from 6 to 96 inches in diameter, contact the Industrial Products Division of

AMERICAN WELDING

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 108.

Instrumentation

Bulletin published by a major instrument manufacturer is an index of literature compiled and published by its industrial division. It covers catalogues, bulletins, specification sheets, data sheets, illustrated lectures and articles from the company's bi-monthly magazine. *Industrial Div., Minneapolis-Honeywell Regulator Co.*

For free copy circle No. 15 on postcard

Product producibility

Tool, die and machine design; production engineering and product design and development services are described in a folder now available. A product producibility study and manufacturing cost analysis method is covered. This is designed to help management predict costs before making capital expenditures. Also included are a company history, operation methods and descriptions of services. *Engineering Service, Inc.*

For free copy circle No. 16 on postcard

Hand forgings

One aluminum company draws on 40 years of forging experience for facts and figures presented in its latest publication, "Technical Data on Alcoa Hand Forgings." The booklet answers questions of designers, engineers and purchasing agents seeking high-strength, low-weight advantages of aluminum for parts of limited production. The 16-page booklet is well illustrated with 30 photographs and drawings. *Copies are available by writing on company letterhead to Room 787, Alcoa Building, Pittsburgh 19, Pa.*

Motor driven cranes

Motor driven cranes featuring fluid drive appear in a four-page brochure. These cranes, it says, are job engineered for: long wear, top performance, low maintenance cost and durability. Specifications are given on the unit's motor, fluid drive, gear reducer, brake, truck wheels, axles and bearings. Top and front views are illustrated in an engineering drawing. Booklet also includes photographs of several various crane types. *Philadelphia Tramrail Co.*

For free copy circle No. 17 on postcard

Vertical pumps

A vertical pump booklet covers vertical pumps for industrial and municipal primary water supply. It pictures and describes how the pumps are made and gives specifications for several types. Drawings illustrate cut-away views of the pumps and incorporate a nomenclature listing. Several typical applications are shown. *Layne & Bowler Pump Co.*

For free copy circle No. 18 on postcard

Welded fabrication

"Wonders of Welded Fabrication" contains dramatic stories of modern steel plate fabrication. Its theme is how this comparatively-new manufacturing method has already surpassed the seven wonders of the world in ingenuity and accomplishment. Welded fabrication is shown as indispensable to almost all basic industries, including automotive, electric power, aircraft, machine tools, heavy equipment, special machinery and atomic energy. *Acme Welding Div.*

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Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted **11/1/56**

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No postage necessary if mailed in the United States

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Gas analyzer

Information on a new RF gas analyzer is contained in a new booklet. It contains performance and application information, and specifications. The analyzer's described advantages include: compactness, ruggedness, versatility, simplicity, low cost, ease of operation, and portability. It can be used both as a continuous stream analyzer or routine laboratory instrument. *Scientific Instruments Div., Beckman Instruments, Inc.*

For free copy circle No. 20 on postcard

Pocket pH meter

Versatile and low-priced, a pocket-size pH meter for acidity and alkalinity measurements is explained in information literature. It says the meter is accurate, dependable and easy-to-operate. It uses a combination electrode and is battery-operated. Range is from 2 to 12 pH. The single electrode combines both reference and glass electrodes and has a "memory" dial for use in standardizing. *Scientific Instruments Div., Beckman Instruments, Inc.*

For free copy circle No. 21 on postcard

Plastic tubing

A flexible plastic tubing is covered in a bulletin now available. This 28-page booklet covers tubing formulations individually and in technical detail. Applications and limitations of each formulation are presented. Physical properties and chemical resistances based on ASTM testing methods are presented in chart and table form. Each chapter includes photographic illustrations of actual applications. *Plastics & Synthetics Div., U. S. Stoneware Co.*

For free copy circle No. 22 on postcard

Plywood panels

Sequence-matched hardwood plywood panels are fully-illustrated in a new folder. It contains descriptions of the firm's line of paneling for commercial, institutional and industrial building. Reference is made to free consultation service provided by the company. *Atlas Plywood Corp.*

For free copy circle No. 23 on postcard

Liquid chillers

Combination air and water cooled electric refrigerated liquid chillers are featured in a brochure now available. It describes the unit as ideal for cooling liquids such as coolants and hydraulic oils. It offers a tandem system using water only as an auxiliary in excessive high production or extra hot weather. When operating under normal conditions air is used as a cooling medium for dissipating heat. The system is recommended in localities where water is scarce, or where the present drain systems are used to their near capacity, the brochure states. *Lundholm Mfg. Co.*

For free copy circle No. 24 on postcard

Base power units

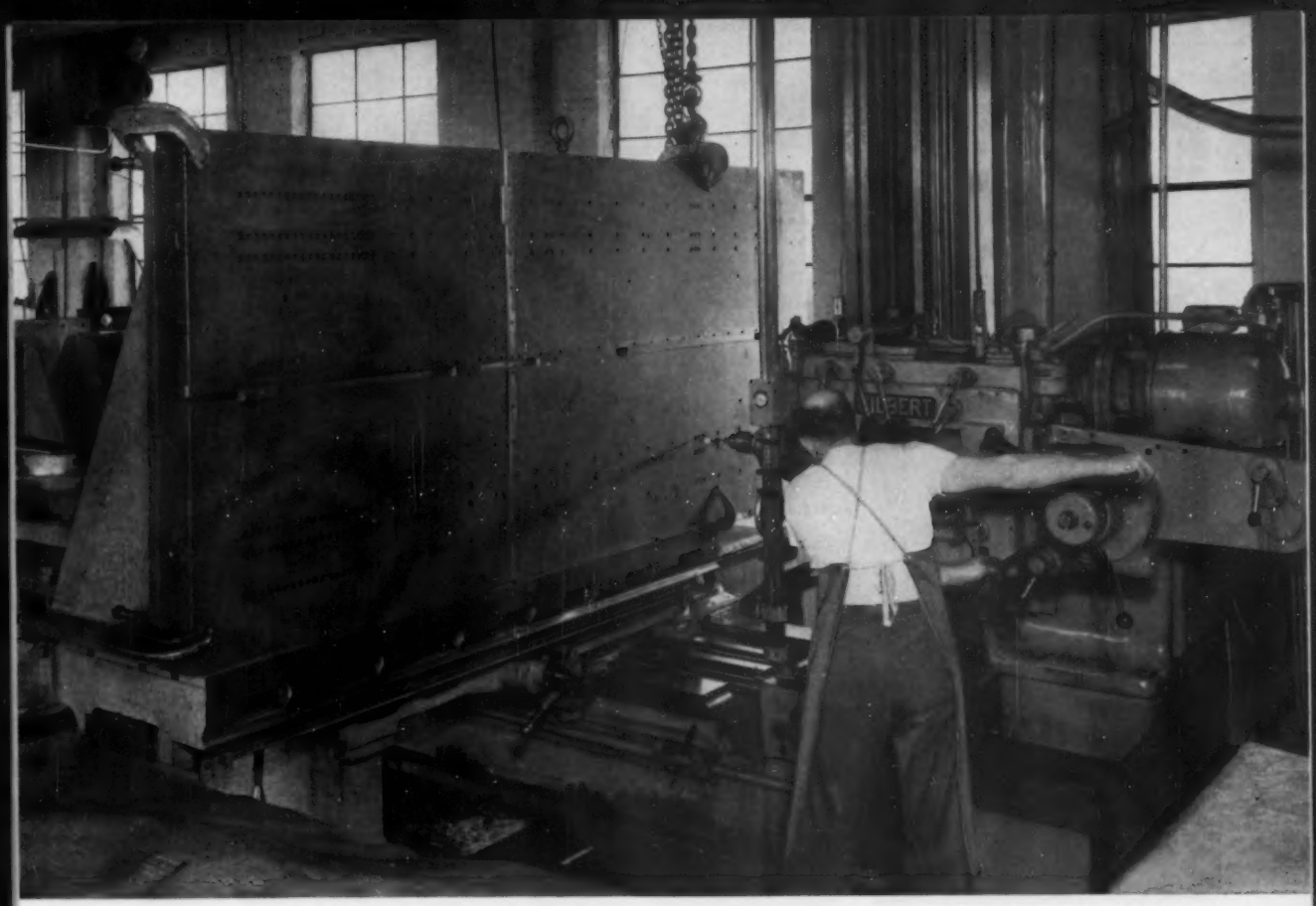
Base power units, blank cast bowls and fabricated supply hoppers are illustrated in a new eight page, two-color brochure. This catalog shows the blank equipment manufactured by one company and offered to the trade either to manufacturers for developing their own feeders, or as blank units to feeder companies for development for a specific operation. "There are no gears, cams, eccentrics, spiral screws, belts, motors or bearings to get out of adjustment, wear or require lubrication," the folder says. *Vibratory Feeder Co.*

For free copy circle No. 25 on postcard

Trucks, storage racks

Industrial trucks and storage racks are described in a 20-page catalog now available. It points out many specific commercial and industrial applications for this material handling equipment. The company's line contains a wide range of standard and special trucks. Included are four-wheel and two-wheel trucks as well as semi-live skids, shelf trucks, dollies, trailers and dragline trucks. Introduced for the first time in the catalog are a new barrel and drum truck and a complete series of noncorrosive trucks. The storage racks consist of three different types of pallet racks and two types of drum and barrel racks. *Lewis-Shepard Products, Inc.*

For free copy circle No. 26 on postcard



courtesy Linden Tool and Manufacturing Co.

Linden's Gilbert holds 235 holes on location ±.0007″

This is the kind of job you can handle profitably if you have a good operator and a Cincinnati Gilbert horizontal boring mill.

The piece is a 50″ by 120″ base for special indexing. Linden Tool and Manufacturing Co., Dayton, O., performs these operations:

1. Mill keyways 9/32″ deep, full length and width of the base. Width of each keyway is 1.000″ ± .001″.

2. Drill 235 indexing holes, .625″ diameter. These holes must be held on location within ± .0007″. In addition, center lines of the holes (horizontal and vertical) must be parallel and square with the key-ways within .001″.

This job is another demonstration of the exceptional rigidity of Gilbert boring mills. Extended table and saddle supports help to maintain accuracy and handle the workpiece. Linden Tool and Manufacturing Company uses two Gilberts to produce a broad range of quality work for its Dayton area customers.

Gilbert boring mills are built as both Table and Floor types, with spindle diameters of 3½″, 3¾″, 4″, and 5″. A selection of column heights, bed lengths, table sizes, and workholding units makes them easily adaptable to your requirements. Add to your work capacity—and your machining dollars—by getting a proposal from Gilbert now.

The Cincinnati Gilbert Machine Tool Co.
3344 Beekman Street, Cincinnati 23, Ohio

Low-cost financing plan—6% simple interest (3% add on), up to 5 years to pay—makes your purchase of Gilbert equipment immediately feasible.

those who buy Gilbert buy **GILBERT** *again*

RECLAIM CHIPS

at Lower Cost

with *National* Metal Chip handling and Oil reclamation systems . . . for over 25 years leaders in the field.

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CONVEYORS COMPANY, INC.
Fairview, Bergen County, N. J.
Manufacturers of Ash Conveyor Systems and Pneumatic Systems for handling granular materials.

WARD STEEL CO.

PROMPT WAREHOUSE SERVICE ONLY
Most Complete Stock in America of
BLUE TEMPERED SPRING STEEL
We believe that the way to sell is to carry a stock which permits satisfying any reasonable warehouse demand.

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FINISHING: Litho'ed Steel

Light gage cold rolled sheet feeds into lithographing plant . . . It gets printed, coated and waxed . . . Fabricating firms then turn it into toys, breadboxes and oil cans.

At its Yorkville, Ohio works, Wheeling Steel Corp. coats and lithographs flat rolled steel. Most of this decorated production ends up as toys, waste baskets and similar items where metal protection and eye-appeal are important. Alkyd inks and alkyd, vinyl, epon and phenolic coatings are applied to bare or tin coated flat rolled steel. This is then shipped to customers' fabricating plants. There, flat sheets, on which the decoration has been accurately registered, are cut into blanks and formed into products.

Photocomposing machine transfers designs to press plate.

The firm produces tin mill products and lighter gages of cold rolled sheets. Adjacent to the mill but in a separate building is housed the metal decorating equipment and personnel. Areas containing photo-engraving equipment, the experimental and quality control laboratory and offices are fully air-coinditioned. The 220 x 440 ft building has its own truck and railroad unloading and loading platforms, as well as ready access to river dock for barge shipment.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Does Automatic Lithographing

Production areas are laid out for straight line, automatic lithographing or coating of 70 to 128 lb black plate; 70 to 135 lb electrolytic or hot dipped tin plate; 28 to 18 gage cold rolled sheets. Before decorating, these flat rolled items are custom-made to the buyer's requirements of chemical analysis, temper and drawing quality.

To complement its printing presses, the decorating plant has six Wagner coaters which are used for the application of lacquers or enamels. Four of these coaters are equipped with single drying ovens and are capable of

Waxer applies atomized wax coat to steel sheets.

coating only one side of the sheet with one pass. The remaining two are tandem coaters set so that a sheet receives a coat on one side. It then passes through a drying oven, and receives a coat on the reverse side. It continues on through a second drying oven.

Two of the single coaters will accommodate a maximum sheet size of 36x44 in.; the third 36x42 in.; and the fourth 36x48 in. Max-

Litho press prints on 18 gage, 37½ x 53½-in. sheets.

imum sheet size limits for the two tandem coaters are 28x38 in. and 30x38 in. Depending upon requirements, seven to 15 minutes lapse from the time a sheet is fed into a coater or printing press until it emerges from the drying oven.

Spray On Wax Coat

Following coating or printing, decorated sheets automatically are fed through one of two machines. These spray a protective coat of wax on either one or both sides. The thickness of this coat can be varied. Sheets are inspected and finally packaged for shipment.

Lubricants:

New grease cuts costs, lengthens equipment life.

New specialized lubricants provide effective protection against more than 100 corrosive agents and solvents. In addition, they prevent leakage, preserve packings, protect equipment and floors, and lower

YARD and FACTORY

TRAILERS

Fifth wheel steer. Pneumatic tires. Steel deck. Oak end and side racks.

CUSTOM-BUILT and quality-built for long-time, low-cost service. Flat steel wheels, solid rubber or pneumatic tires. Fifth-wheel or four-wheel knuckle steer. Steel or wood deck, or special superstructure. Any desired capacity.

Telephone or write to:

OUR 42ND YEAR

EASTON®

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

A 1081

New ARMSTRONG Armide CARBIDE INSERT TOOL HOLDERS

The advantages of Carbide Cutters with the Multiedged "throw away" ARMIDE inserts

New ARMSTRONG Armide Carbide Insert Tool Holders hold multiedged, throw away Armide inserts. They end tool grinding and reduce down time. After an edge dulls, a slight turn of the clamping screw permits rapid indexing of the insert to a new cutting edge. Triangular inserts have 6 cutting edges; square inserts have 8 edges. They are available in three grades—Armide 350, 370, or 883.

ARMSTRONG Armide Carbide Insert Tool Holders are furnished either "Right Hand" or "Left Hand" in the two styles illustrated, each in 3 sizes.

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

5209 W. ARMSTRONG AVE. • CHICAGO 30, ILL.

Buy ARMSTRONG TOOLS from your Industrial Distributor

operating and maintenance costs. Users report savings as high as 50 pct in comparison with conventional general-purpose lubricants, according to Keystone Lubricating Co., Philadelphia.

The new line consists of three types covering a wide range of operating temperatures (from 0 to 350°F). They have a smooth, nonfibrous body.

Welding:

New iron-powder electrode welds mild, galvanized steels.

A new iron powder electrode for welding mild and galvanized steels is recommended particularly for structural welding, ship building, tank fabrication and general maintenance.

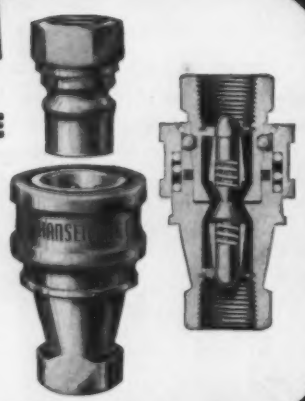
The electrode is suitable for use in all welding positions on any type of current at high amperages. Field tests show it provides easy handling and slag removal, according to Metal & Thermit Corp., N. Y.

With a fast rate of deposition, the new electrode has light spatter and operates with a quiet, moderately penetrating and easily-directed arc. Other features are good ductility and excellent mechanical properties of the weld deposit.

HANSEN

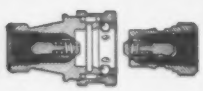
QUICK-CONNECTIVE

2-WAY SHUT-OFF COUPLINGS!



QUICK CONNECTION AND DISCONNECTION

INSTANT AUTOMATIC FLOW OR SHUT-OFF



Seals Both Ends of Line
AUTOMATICALLY INSTANTANEOUSLY

To connect a Hansen Two-Way Shut-Off Coupling, you just pull back the sleeve and push the Plug into the Socket. To disconnect, merely pull back sleeve. No tools required. Similar valves in Socket and Plug shut off both ends of line when Coupling is disconnected—practically eliminate spilling of liquid or escape of gas at instant of disconnection.

Quick Connective Fluid Line Couplings for
AIR • OIL • GREASE • STEAM
HYDRAULIC FLUIDS • VACUUM
REFRIGERANTS • OXYGEN
ACETYLENE • GASOLINE
WATER • COOLANTS

HOSE CLAMPS
HOSE CLAMP PLUGS
HOSE CLAMP SOCKETS
HOSE CLAMP COUPLINGS

FEMALE PIPE THREAD CONNECTIONS FROM ⅛" TO 1"

Hansen Series HK Two-Way Shut-Off Couplings are available with female pipe thread connections from ⅛" to 1" inclusive. Available in brass or steel.

Also Straight-Through and One-Way Shut-Off Couplings. Write for Catalog.

REPRESENTATIVES IN PRINCIPAL CITIES

SINCE 1915 — QUICK-CONNECTIVE FLUID LINE COUPLINGS

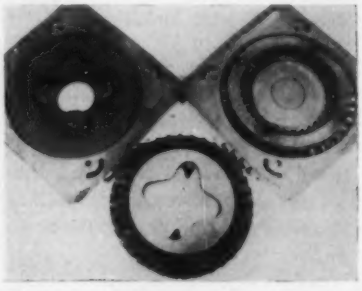
THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 11, OHIO

Foundry:

Casting process produces better nozzle rings.

A different method is used by a major steel company for producing turbosupercharger nozzle rings for use in diesel engines where the high temperature of exhaust gases is a major factor.



Casting is shown with shell mold and core assembly.

The Almold casting process is now utilized by Allegheny Ludlum Steel Corp., Pittsburgh, in making nozzle rings for turbochargers built by ALCO Products, Inc., Schenectady.

Sand Core Casting Dropped

The company changed from the sand core casting method to the Almold process as a result of research by engineers at its forging and casting and Watervliet plants.

In the Almold process, type 321 stainless steel nozzle ring vanes are placed in a box cavity. The pieces are positioned and then

type 410 stainless steel is cast around the vanes.

Tolerance is 0.010 in. The nozzle ring hubs outside diameter is cast to a finish size between zero to 0.020-in. tolerance, with ⅛-in. to finish on the face.

The exhaust gases that beat upon the nozzle ring under operation on a diesel engine reach 1245°F for extended periods of time.

Fasteners:

Improved manufacturing process reduces spiral nail cost.

Spiral nails aren't new. For some time, carpenters, pallet makers, box manufacturers and others have claimed their superior holding power over conventional nails. However, because of costly production methods, they have not been widely adopted.

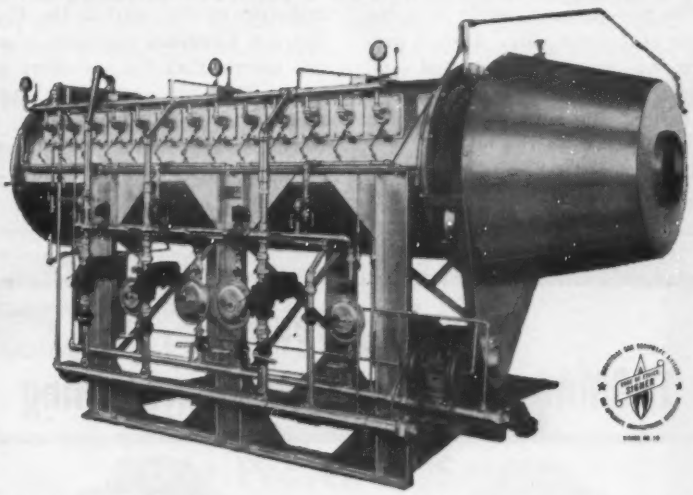
A new manufacturing process, developed by The Steel Co. of Canada, Ltd., has overcome this single disadvantage, however. Thanks to them, the previous methods of separate threading and twisting soft wire with subsequent heat treatment have been eliminated. Now, threaded nails, which use the same principle as the wood screw, offer: (1) increased holding power. (2) easier driving, (3) reduced wood splitting and (4) less cost per nail.

More driving of spiral nails is expected, due to lower cost.

Paradoxical as it may sound, al-

"PART OF AUTOMATION"

AUTOMATIC HEAT TREATING



Up to 1000 lbs. of BOLTS per hour . . .

Bolts, screws, precision machine parts, nuts, rings, pins and anything requiring heat treating in a positively controlled atmosphere can be automatically hardened and tempered in the—

AGF ROTARY RETORT Heat Treating Furnace

- MAINTENANCE cost is negligible.
- 50 YEARS OF PROVEN SERVICE.
- ABSOLUTELY SAFE. No operator danger.
- EASY TO OPERATE. "Push Button" control.
- COMPLETELY OUTDATES other methods.
- CLEAN HARDENS without mess and dirt.
- DEPENDABLY UNIFORM HARDENING.
- COMES IN SEVERAL SIZES of furnaces.
- FACTORY TRAINED REPRESENTATIVES in principal industrial areas.

AGF Rotary Retort Heat Treating and Tempering Furnaces are used by most of the large and small producers of precision metal products because AGF originated the rotary furnace that constantly rotates the work and prevents "contact spots".

In operation the work is fed into a hopper that mechanically controls the feed to the spiral. This spiral carries the work through the retort and into the quench, completely sealed from outside air.

It's the positive way to accomplish perfect hardening—automatically.

Ask AGF Metallurgists and Engineers for a recommendation. There's no obligation.

PIONEER INVENTORS, DESIGNERS AND BUILDERS OF INDUSTRIAL HEAT TREATING AND GAS TEMPERING EQUIPMENT SINCE 1878

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though nails cost more per pound, they cost less per nail. This is because there are more nails per pound.

The new process merely calls for using stiff stock wire. This is prethreaded, then cut, pointed and headed into nails. Because of this operation, the thread form goes up to the base of the head.

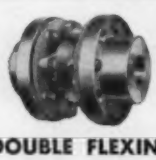
Jones & Laughlin Steel Corp., Pittsburgh, expects the spiral fastener to replace the common smooth shank nail in "large measure." As licensed manufacturers and distributers of the nail in the U. S., Jones & Laughlin considers it serious competition for its other nail lines. They are one of the largest manufacturers of nails in the world, making over 1000 different sizes and types.

Coupling problem?
THOMAS will help select your coupling

FLOATING SHAFT
BMR—for heavy duty service where excessive misalignment is expected

DOUBLE FLEXING
DBZ—for high speed, heavy duty drives

SINGLE FLEXING
SS—for engine-driven generator sets, especially with outboard bearing



DOUBLE FLEXING
AMR—for engine and medium speed drives

Your Thomas Sales Engineer, backed by 40 years of coupling experience, will help you select the correct type Flexible Coupling from the Thomas catalog. Or, he will engineer special variations for unusual cases. For all practical purposes, properly installed and operated within rated conditions, Thomas Flexible Couplings will last *forever.*

NO LUBRICATION • NO MAINTENANCE • THERE ARE NO WEARING PARTS

Under load and misalignment, only Thomas Flexible Couplings offer *all* these advantages:

1. Freedom from backlash—torsional rigidity
2. Free end float
3. Visual inspection while operating
4. Smooth, continuous drive with constant rotational velocity
5. Original balance for life

Write for Engineering Catalog 51A and the name of the Thomas Flexible Coupling engineer nearest you

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.

Handling:

Setup weighs materials while being carried.

Materials and parts are weighed while being handled between production operations with a new electrical weighing setup. A fork truck system using an SR-4 load cell developed by the Baldwin, Lima, Hamilton Corp., allows weighing of objects while they are still being carried by the truck. The load cell is based on a bonded strain principle. It is widely accepted in industry for measurement of loads and forces.

No Delicate Parts

The load cell consists of a small, insulated wire grid bonded to a structural member which can be subjected to either tension or compression. It responds by resistance changes to a slight electrical current flow. The changes are recorded by instruments. The cell is hermetically sealed in a rugged steel housing. Overloads are handled without damage via a system of overload stops. No delicate parts are contained in the cell to wear out or get damaged.

A load placed on the truck's forks is transmitted to a "load senser." When hooked up to a weight recorder, it offers a weighing accuracy of 0.25 pct. of the full range.

Cell Is Easily Installed

The Baldwin setup is installed easily with a minimum of truck down-time. After removing the forks, the load sensing instrument is bolted to the lift brackets. The forks are replaced. Then the recording device is placed in a convenient location. Cables are then connected to a six volt Exide battery and the instruments.

According to Baldwin, the setup is adaptable for all standard capacity trucks. It is recommended for replacing currently used platform scales. This would allow the lifts to weigh while en route, instead of being "sidetracked" for scale weighing.

Finishing:

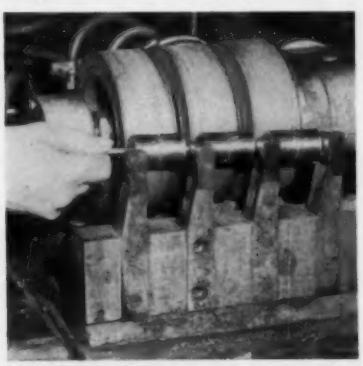
Belt finish grinds motor parts four times faster.

Through use of a specially fixtured abrasive belt grinder, small electric motor rotors are finish ground four to five times faster than by conventional methods. These are done to 0.0001-in. concentricity tolerances at Olsen Machine & Tool Co., North Abington, Mass. This new adaptation is a development of Engelberg Huller Co., Syracuse. It is a modified platen-type machine equipped with oscillating hydraulic in-feed table and pneumatic cylindrical grinding fixture.

Uses Multiple Loading

Rotors, ranging in size from ⅜-in. stack (width) to 1½-in. stack, and from ½-in. diam to 1½-in. diam, are multiple loaded on a slide fit arbor. They are then inserted in carbide-lined V-blocks of a work holding form. The air-operated cylindrical grinding fixture, mounted on an automatic in-feed table, consists of three rubber wheels. These are 6-in. in diameter, with 1½-in. face.

The regulating wheels, at 12 rpm., revolve the rotors against



Slide-fit shaft, loaded with six rotors, is inserted in holder.

the abrasive belt. The belt is backed by a hardened steel platen with ½-in. carbide insert behind contact area.

The machine permits concentricity tolerances down to 0.0002-in., and diameter tolerance of plus or minus 0.0005-in. The complete grinding cycle, loading, grinding and unloading, requires about 12 seconds. Depending on width and diameter of rotors, production rates can exceed 2000 rotors per hour.

Preliminary tests and production data on the first installation at Olsen Machine and Tool indicate rotors should be lathe turned or die-trimmed to within no more than 0.010-in. oversize.

Rotors were copper and cold-rolled silicon steel laminated into stacks from ⅜ to 1½-in. thick.

The belt grinder eliminates the need for fixing rotor shafts prior to finish grinding, formerly necessary for locating purposes. As many as 12 rotors can be nested simultaneously.

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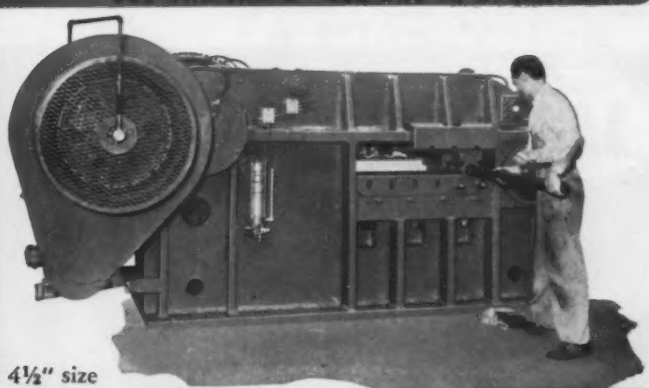
In Billet Shears . . .

Now Proven In Service

HILL ACME BAR BILLET SHEAR

GET THE FACTS—SEE ONE IN OPERATION



4½" size

- Simplicity of Design. Clean, square cuts. Low maintenance.
- You'll be amazed at it's performance. You'll be surprised at the price.
- Made in 3", 4½", 6½" sizes and larger. Choice of hand, semi-automatic or fully automatic feed.

Full details and specifications are given in Bulletin SP-56.

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MACHINING: Carbides, Cemented Oxides

Two cutting tool materials team up on the same machining setup . . . They offer one answer to overcoming cutting problems at speeds from zero to 2600 fpm . . . Pair provides cuts on some steels below 100 fpm and above 1000 fpm.

By teaming up two cutting tool materials on the same machining setup, cemented carbides and cemented oxides, engineers now believe they have the key in overcoming cutting problems at speeds of 0 to 2600 fpm.

Until recently, machining speeds below 100 fpm on some steels with carbides were almost a lost cause, according to General Electric Metallurgical Products Dept. spokesmen.

This was because of the seemingly inability of carbides to withstand cuts on medium to soft steels at slow speeds, or the lack of machine tools with the speed versatility for the particular part being cut.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

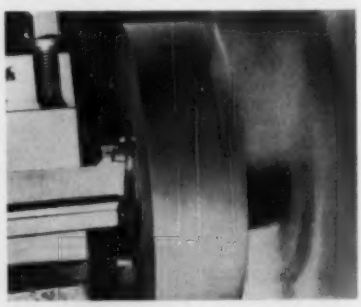
At speeds above 1000 fpm, the picture was almost equally hopeless since carbides failed at the cutting edge despite their hardness at high red hot heat.

Higher & Lower Speeds

The availability of superior grades of carbides and cemented oxides, coupled with proper tool design, now make it posisble to extend the machining horizon in two directions: above the current carbide cutting speed range, and down into the "entrenched" high-speed steel cutting tool area.

On the low speed side with carbides, they say, tool geometry plays an important part. Cutting forces increase rapidly below 200 fpm on both positive 6° and negative 5° side rake tools, but these drop down as speed is reduced below 100 fpm on the 5° negative rake tools.

In reaching for the high speed side, however, ceramics seem to be the answer since the optimum speed of ceramic type tools is much higher than that of carbides at speeds over 1000 fpm. One thing is sacrificed, though. This is a reduction in cutting tool material strength.



Pair faced this 12-in. steel blank in less than a minute.

Thus it is important, the engineers emphasize, to look closely at the economics involved. The user

For most economical threading on all Automatic Screw Machines, Chucking machines, Bolt threaders, Drill presses, etc.

H & G insert chasers

CUT YOUR COSTS AND DOWN TIME

For less than $45 you get 12 sets of ¾-16 (or any stockable size) Insert Chasers; each set ground ready for business. This dozen sets can thread hundreds of thousands of parts with no down time or sharpening time. Can be thrown away when dull or if you prefer, flash grind the dull sets and make an extra profit. Threads stand critical examination and conform to the close tolerances of Class 3 fits. Send for our digest of the Government publication, "UNIFIED AND AMERICAN SCREW THREADS".

THE EASTERN MACHINE SCREW CORPORATION 21-41 Barclay St., New Haven, Conn.

will fare better if he applies ceramic type tools only at speeds beyond the carbide range, since in the carbide range, the latter not only are tougher, but have proved more economical.

Nonferrous:

Sparkling aluminum sheet being developed.

Now under development by the Aluminum Corp. of America, Pittsburgh, is a new finishing process for aluminum sheet and extruded shapes.

Aluminum sheet, processed with this finish, presents a multitude of reflecting facets offering a continually changing surface pattern. Waves of light sparkle across the metal as the light source, the aluminum sheet, or the position of the viewer is moved.

Growth of abnormally large grains gives a sparkle finish.

Tentatively called "Spangle-Sheet," the new finish is expected to have extensive possibilities in decorative applications. It has been applied in color and natural finish to plain and patterned rolled sheet, and extruded shapes.

Employs Acid Etch

The finish is based on inducing the formation of abnormally large grains in a special aluminum alloy. Individual grains are then made to stand out in relief by an acid etch. Action of the etch develops tiny mirror-like facets on each grain. Since, to the viewer, each grain is positioned differently than its neighbor, varying degrees of reflected light can be observed simul-

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Long producers of the gears needed in high grade trucks and tractors, Fairfield now brings the same standards for GEAR PERFORMANCE to a wide variety of products: Agricultural Implements . . . Power Shovels . . . Machine Tools . . . Diesel Locomotives . . . Road Graders . . . Lift Trucks . . . Road Rollers . . . Pump Drives . . . Winches . . . Military Vehicles . . . and a host of others.

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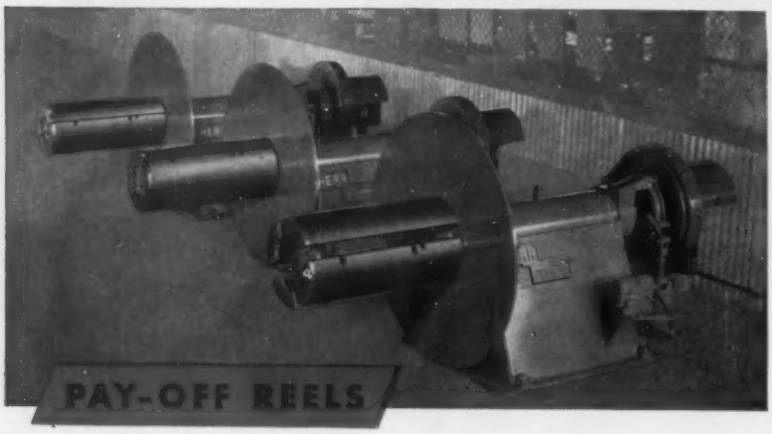
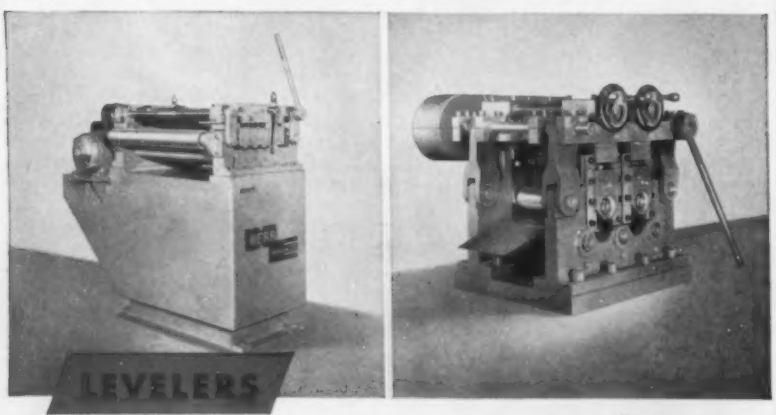
HERR EQUIPMENT

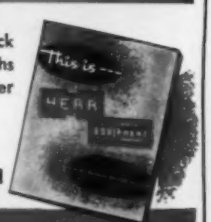
"Complete Processing and Handling Equipment . . . for any Ferrous or Non-Ferrous Material . . . That Starts — or Ends — as a Coil"



Types and sizes for coils weighing from 5,000 to 50,000 lbs. and up to 84" wide. Fixed, adjustable or automatically aligning bases. Timken bearings. Can be equipped with threading drive, also automatic speed compensating drive for feeding presses.



2-High and 4-High types. Driven and pull-through designs with quick release, for handling an extremely wide range of materials, widths and gauges. Rolls can be rubber covered if desired for easier adjustment and handling high finished materials.



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THE HERR EQUIPMENT CORPORATION

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CLEVELAND, INDIANAPOLIS AND BERKELEY, CALIFORNIA

taneously over the sheet's surface.

The result is an aluminum sheet sparkling with highlights surrounded by islands of shimmering silver and contrasting patches of light and dark gray.

The sheet, in one of the color anodized finishes, shows at one time many shades of the color employed. Tones range from the very deep to the very light, with the color shade on the face of each grain changing as light plays across the sheet from various angles.

A product of Alcoa's research and development laboratories, it is not yet available commercially.

Materials:

Clad metal combination offers many advantages.

Medium carbon hardenable steel (SAE-1065) is clad on one or both sides with oxygen-free, high conductivity copper (OFHC) to make a new combination. The metals are inseparably bonded by a solid-phase bonding process without the use of brazing alloys or other intermediate materials.

This produces a composite metal having a continuous permanent bond and high conductivity. According to General Plate Div., Metals & Controls Corp., Attleboro, Mass., excellent spring characteristics are gained by heat treatment. It also has resistance to corrosion, ductility for extreme forming with long tool wear, and good operating characteristics at elevated temperature (below tempering temperature).

Typical Applications

Typical applications are fuse clips, connectors, springs, and switch parts having high conductivity for rheostats, switches, relays, and thermostats. In non-electric applications such as pen and pencil clips, the copper layers provide an excellent surface for electro plated finishes.

The standard cladding ratio with copper on one side is 80/20 ratio (80 pct steel/20 pct copper). With copper on either side the standard is 10/80/10.

Makes it possible to x-ray thicker sections –

cuts gamma ray exposure time

Read what the new Kodak Industrial X-ray Film, Type AA, does for you:

- Reduces exposure time—speeds up routine examinations.
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Whatever your present radiographic facilities, they'll do more work for you with Kodak's new Industrial X-ray Film, Type AA.

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Kodak
TRADE MARK

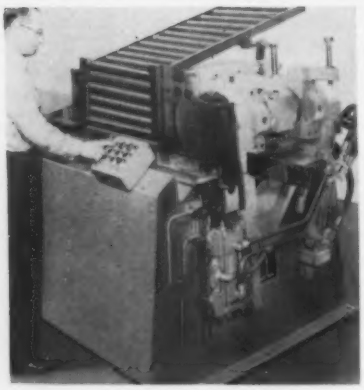
NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 113 or 114.

Heat treating furnace uses induction heating

This furnace is designed for carbonitriding, bright hardening, and carburizing of small parts. It offers two completely new engineering features. The first is its use of induction heating. For several years, the manufacturer has used induction heating in its melting furnaces. This is its initial use, however, in its heat treating furnaces. Induction heating makes possible elimination of heating elements, element terminals, burners, gas or electric connections in the furnace proper. Another feature is its circular shape. This eliminates usual heat and atmosphere losses occasioned when conventional furnace doors are opened to charge and remove the work. The shape also saves floor space. Hardening temperatures can be reached in 17 minutes from cold with the heat treating furnace. *Lindberg Engineering Co.*

For more data circle No. 27 on postcard, p. 113



Machine bends 2-in. steel tube 90° in four seconds

Magazine fed, this heavy duty, high speed machine will bend 2-in. diam steel tubes 90° in a four second cycle without any operating handling. Its new design allows bending the tubing automatically in a vertical plane. It is compact, emphasizes operator safety and has a two-pump hydraulic system. One pump controls a 2000-psi clamping system; the other powers a 1000-psi bending system. A typical machine makes 30, 45 or 90° bends in 2-in. diam steel gasoline tank filler necks in a four-second bending cycle at a net production rate of 650 parts per hour. It has a welded steel base. Both manual and automatic cycle controls are included in a pushbutton panel. Machine is 10-ft long, 4-ft wide and 5-ft high overall. The hydraulic system includes a 40-gpm, 1000-psi, high volume variable flow pump powered by a 30-hp motor. *Water P. Hill.*

For more data circle No. 28 on postcard, p. 113

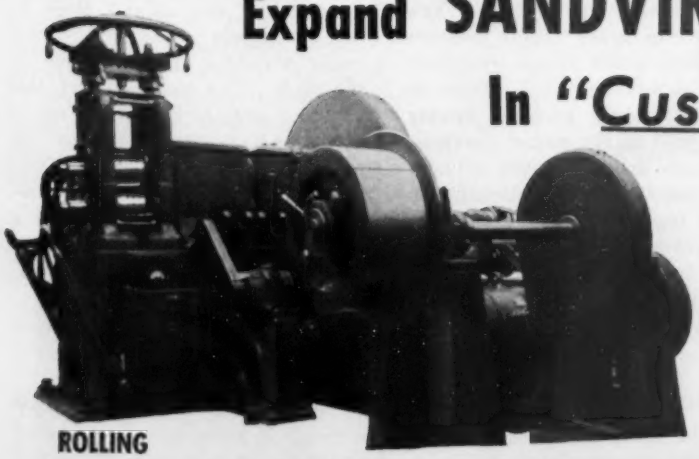
Low-temperature chiller features 4 cu ft chamber

Equipped with a four cu ft chamber, a new low-temperature chilling machine is designed for laboratory testing in regard to quality control and product development uses. It has a net thermal capacity of approximately 600 Btu/hr at —120° F, with a temperature selection from 80° to —120°F, and full range pull down in 45 minutes. Outside dimensions of the unit are: 59-in. high x 25-in. deep x 26-in. wide. The chilling chamber, 18-in. high x 18-in. wide x 17-in. deep, is made of electric welded, pressure tight 14-gage steel, hot dip zinc-coated to specifications of the American Hot Dip Galvanizers' Assn. Rounded corners offer additional safety and strength. The net clear working area is 18-in. high x 18-in. wide x 12-in. deep. Full access to the chamber area is provided by the front opening door. This has a 12 x 12-in. frostproof window. The door's triple seal is of three gaskets, two of sponge rubber. The third is a balloon-type. *Cincinnati Sub-Zero Products.*

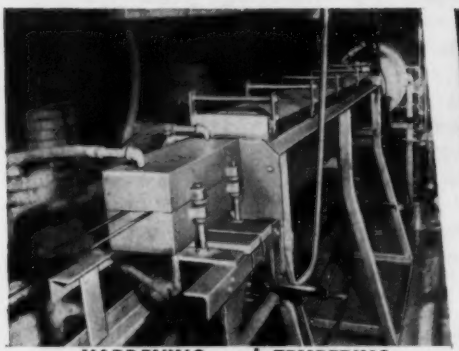
For more data circle No. 29 on postcard, p. 113

New Fair Lawn Facilities Expand SANDVIK Service In "Custom-Tailoring"

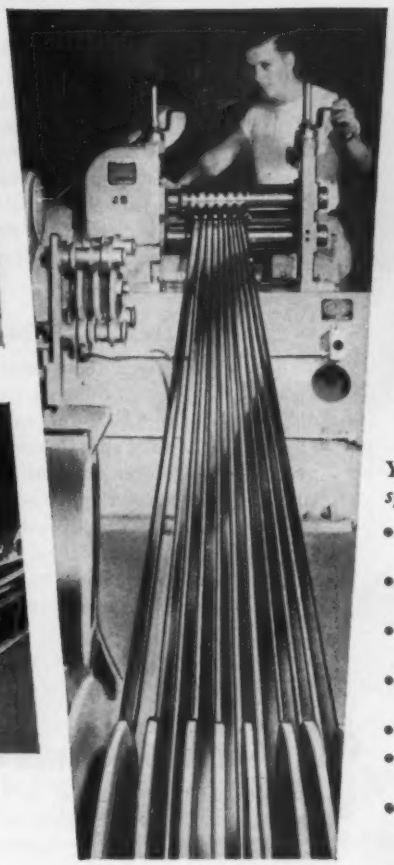
QUALITY SPRING STEELS



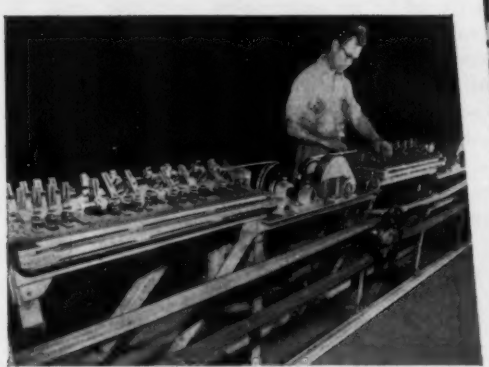
ROLLING



HARDENING and TEMPERING



QUALITY CONTROL



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You can get Sandvik cold rolled specialty strip steels:

- In special analyses for specific applications.
- Precision-rolled in thicknesses to fit your requirements.
- In straight carbon and alloy grades.
- Annealed, unannealed or hardened and tempered.
- Polished bright, yellow or blue.
- With square, round or dressed edges.
- Wide range of sizes in stock — or slit to your specifications.

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Sandvik Quality Steels

SS-114

Main Office and Plant
Fair Lawn, New Jersey

Automatic saw for ingots offers protection features

An improved type hydraulic saw for cutting heavy ingots features a carriage which travels on a cross beam above the ingot. This arrangement fully protects moving parts such as the motor, carriage, saw blade drive and feed cylinder from chips. In conventionally-designed ingot saws where the carriage travels below the stock, chips and lubricants cannot entirely be prevented from dropping on the guides, gears or other moving parts. Feed tables can extend close to the saw blade while clamps are easily arranged on either side of the blade. This enables short, last and first ends to be cut. A mechanized chip conveyor may be placed below the saw blade. Complete operator protection is provided by stationing him behind a wide cross beam support and a window. He can make all adjustments. *Loma Machine Mfg. Co.*

For more data circle No. 30 on postcard, p. 113

Aluminum belts resist stains, rust, have bright surface

New aluminum alloy armored belts are non-staining, rust resistant, lightweight and have a bright surface. Aluminum belting comes in 12, 18, 24, 30, 36, 42, 48, 54 and 60-in. widths and in lengths up to 200 ft. All fixed and variable speeds are available up to 60 fpm. Strength, lightweight and smooth surface are due to spotwelded aircraft type construction. The frame is enameled steel, although further weight reduction is available with aluminum alloy frames. The belt retains the primary advantages of steel belt: standardized interchangeable frame and belt sections, positive sprocket drive, self tracking belt, ability to incorporate vertical curves for multilevel operation, load carried on ball bearings, strong frame for 10-ft span between legs. *M-H Standard Corp.*

For more data circle No. 31 on postcard, p. 113

Unit drills 24-in. deep holes; only 0.001-in. drift

This machine drills to a depth of 24-in. with a maximum drift of only 0.001-in. to 0.0015-in. per foot of depth. The drill spindle operates over a 36 sq ft area without resetting the material. Rapid indexing controls eliminate layout and drill jigs entirely. Drilling in a single work piece allows an identical number of holes to be contained in a greatly reduced area. It is recommended when compactness is necessary and parallel drilling is required to extensive depth. Since no appreciable tolerance need be considered for drift, remaining wall thickness between holes can be calculated for working strength only. The range of operating surface in combination with the depth feature, in either stacked or solid material, affords savings in set-up and handling time, according to the manufacturer. *Lahr Machine & Tool Corp.*

For more data circle No. 32 on postcard, p. 113

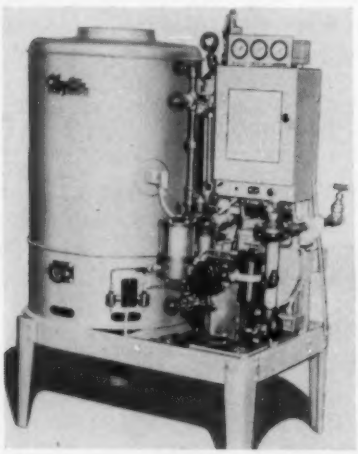
Milling operation avoids pallet transfer mechanism

Incorporating 24-stations, a 55-ft long in-line transfer machine includes a target milling operation that does away with pallet mechanisms. Conventional handling methods call for each part being clamped in an individual fixture or pallet. This is transfered from station to station. The new hydraulically operated machine has a unit that tips the part up after the milling operation. Automatic devices enable it to be tipped up and located throughout the transfer from one precision operation to the next, including a four-spindle boring setup, air gage inspection and automatic hole probing before tapping. The machine contains nine individual segments. Each has its own electrical controls and bases. *Snyder Tool & Engineering Co.*

For more data circle No. 33 on postcard, p. 113

Steam generators

Containing a balanced-feed design, a forced-circulation generator is now available in increased horsepower ratings. Formerly offering a normal rated boiler hp of 15, these models are now obtainable with a 30 hp rating. Maximum hp has also doubled, from 16.5 to 33



hp. Normal output at 33,475 Btu per hp therefore becomes 1,004,250 in normal operation. Normal steam output is 1035 lb per hour. The steam generators are designed with a pressure of 200 psi. *Clayton Mfg. Co.*

For more data circle No. 34 on postcard, p. 113

Submicron filter

Ultra-fine water filtration is possible with a new MF submicron filter. It filters out particles as small as 0.000016-in. The filtering element consists of a cellulose ester disc approximately 150 microns thick with total pore volume of 80 to 85 pct. The operating pressure drop across a clean filter disc is less than 0.3 psi at flow rate of 100 gal per hour. This filter element, as described by the maker, provides quantitative retention of all particles larger than 0.45 micron suspended in water at temperature under 200°F. Bacteria are removed to achieve sterility. The filter element is particularly well suited for analysis, when desired, of impurities retained on the filter. *Barnstead Still & Demineralizer Co.*

For more data circle No. 35 on postcard, p. 113

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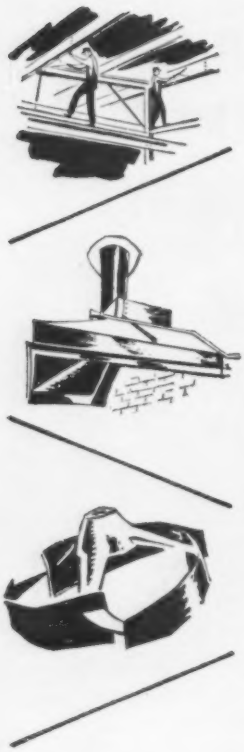

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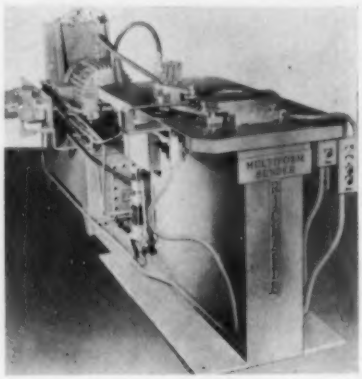
Write for Bulletin 7-2

TECHNICAL REPRESENTATIVES LOCATED THROUGHOUT THE UNITED STATES.

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

Bending machine

Equipped with special tooling for production of tubular chair back supports, this complete unit's overall size is 4-ft 11-in. x 4-ft 5-in. Its table size is 30-in. x 56-in. and height is 40-in. The setup has a standard ram stroke of 4-in. and an auxiliary cylinder sweep stroke of 18-in. Shut distance between heads is 6 and 8-in. adjustable. Operated by a 15-hp motor totally enclosed,



it is electronically controlled and has a bending power of 25 tons. Its automatic production cycle is six seconds. It may be equipped for a multiplicity of operations for bus bar forming, metal fabricating, stamping, blanking, staking, and piercing. The machine makes use of dies, mandrils and combinations of both. *J. A. Richards Co.*

For more data circle No. 36 on postcard, p. 113

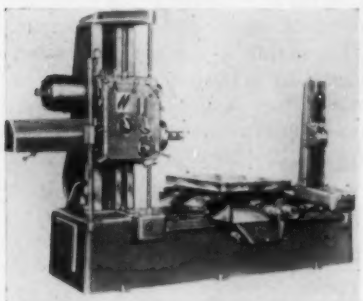
High speed lathes

Featuring heavy-duty variable speed drives, new 11 and 13-in. swing lathes have higher spindle speeds to permit infinite selection of speeds from 40 to 1800 rpm. Speed changes are made visually and instantly by raising or lowering a T-handle speed selector lever. Actual spindle speeds are read on the large tachometer dial built into the head-stock. Only nine seconds are required to change from low to high speeds in either direct drive or back-gear. The spindle speed range is 200 to 1800 rpm in direct drive and 40 to 300 rpm. in back gear. *Sheldon Machine Co., Inc.*

For more data circle No. 37 on postcard, p. 113

Horizontal borer

Multipurpose 3-in. horizontal boring machines provide versatile service in toolrooms and production shops. An extensive range of speeds and feeds permits machining practically any material with high-speed steel, carbide and ceramic tools. Its jib crane-mounted facing head swings to the rear

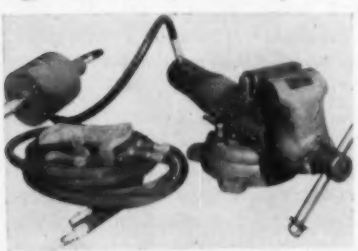


when not in use; it need never be removed. It can be attached to the headstock by simply swinging it around. The headstock spindle is free to pass through the facing head so that the machine may face and bore simultaneously. Standard machines have 18 feeds, 16 speeds, 31-in. spindle-to-table height. *S & S Machinery Co.*

For more data circle No. 38 on postcard, p. 113

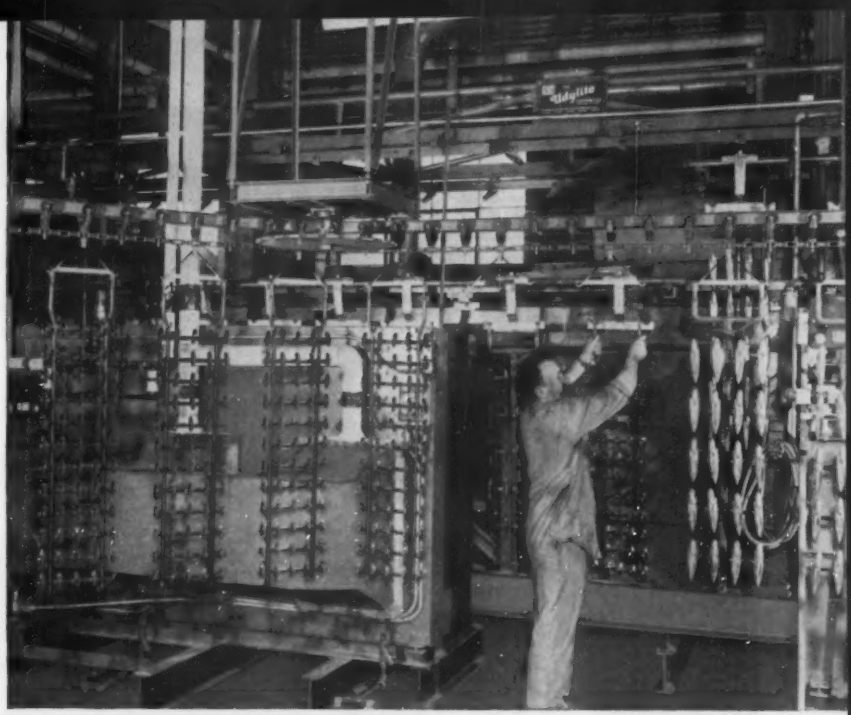
Hydraulic vise

Air hydraulic vises eliminate wasted time and labor of manual clamping, and speed production on a wide variety of bench operations. Assembly and testing, finish grinding, cut-off work, and many other



jobs that require frequent work piece clamping and unclamping can be speeded up with the vises. It can open and close up to 2000 times an hour, at the touch of a foot pedal air control. Maximum jaw locking force varies between 2513 to 6891 lb. *Wilton Tool Mfg. Co., Inc.*

For more data circle No. 39 on postcard, p. 113



QUALITY IMPROVED—PRODUCTION INCREASED WITH UDYLITE PROCESSES AND EQUIPMENT

In the manufacture of rear view automobile mirrors by Yankee Metal Products Corporation of Norwalk, Connecticut, a variety of die cast parts are used. All of these die cast parts are copper, nickel and chrome plated on the Udylite Full Automatic Plating Machine. Shape and sizes of these parts vary considerably.

The Udylite Full Automatic handles the complete processing of the parts from the bare die castings to a finish ready for final assembly. Its operation has provided perfect precision, a doubled capacity and a minimum of rejects.

Udylite Bright Nickel has played an important part in the perfect coverage of these die castings. With the chrome overlay, Udylite Bright Nickel has provided not only the glistening finish demanded for this luxurious line, but also the guaranteed protection for these accessories which are constantly subjected to attack by the elements.

Hand in hand, Udylite equipment and processes are solving many plating problems. Providing sales appeal finishes—plated protection —multiplied production. Find out how you can use these same advantages.

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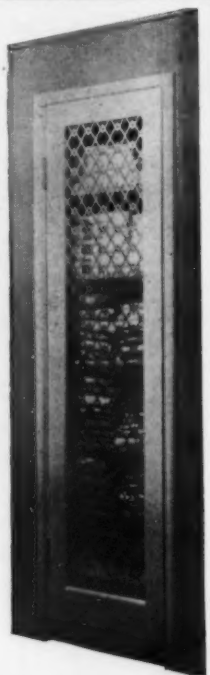

More and more designers are including Hendrick Perforated Metal in the fabrication of new products. Typical of these is one company who manufactures the attractive room divider shown above using Hendrick Perforated Metal Square Link design. Another manufacturer installs an attractive Hendrick Ornamental Metal Grille on linen closet and locker doors.

And there are thousands of other applications where Hendrick Perforated Metal has added to product style and functionalism. For information on the type of perforated metal or grille best suited to your needs, call Hendrick today.

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Air hydraulic press

This press has a dual pressure booster assembly which advances the ram to contact with the work piece at high speed with nominal power before full rated pressure is applied. Under operating conditions this has indicated a minimum air saving of 75 pct, as compared to other types of air actuated equipment of equal power and stroke. This saving is accomplished when operating press with full stroke. A recent test record on a three ton press in actual production performed 80 three inch stroke cycles

per minute and consumed only 10 cu ft of compressed air at 80 psi. The press features a power package which is easily and quickly removed from the press housing if and when repairs are required. *Studebaker Hydraulic Products Co.*

For more data circle No. 40 on postcard, p. 113

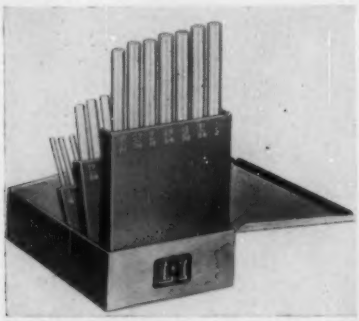
Insulating tape

Latest addition to a line of electrical tapes is a new 2-in-1 silicone glass cloth tape. Among the unique properties claimed for it are: high dielectric strength of 5000v, more per mil thickness than any other available class "H" tape, and high temperature insulation properties. The tape will withstand exposure to 550°F. Backing is silicone varnish treated glass cloth. *Permacel Tape Corp.*

For more data circle No. 41 on postcard, p. 113

Drill, reamer blanks

New high precision drill and reamer blanks are available in fractional sizes 1/16 through 1-in., wire gage sizes #1 through #80, letter sizes A through Z and in complete sets. Drill blanks come up to ½-in (+

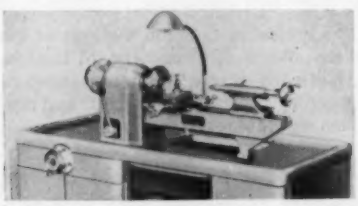


0.0000, —0.0003-in.); over ½-in. (+0.0000, —0.0005-in.). Reamer blanks come up to ½-in (+0.0002, —0.0000-in.), over ½-in (+0.0005, —0.0000-in.). Complete sets are packaged in convenient metal cases. *Lavallee & Ide, Inc.*

For more data circle No. 42 on postcard, p. 113

Standard precision lathe

Described by its maker as "the last word," a new standard lathe is designed for turning and general toolroom work wherever a precision bench lathe is required. It has a hardened and ground bed, a totally enclosed headstock of 1-in. collet capacity, and a 7-in. swing. The lathe headstock spindle is equipped with preloaded anti-friction staggered cylindrical roller



and ball bearings. Equipment consists of draw-in bar, offset-type tail stock with hardened and ground full bearing spindle, hand rest, dog face plate, centers and center collet. It also comes equipped with compound slide rest, with large diameter acme threads in long bronze nuts. *Wade Tool Co.*

For more data circle No. 43 on postcard, p. 113

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WHEREVER YOU GO you're likely to find through-the-air handling in use . . . even 350 ft. underground. This Shepard Niles Crane, for example, is installed in a coal mine's underground machine shop. The 19 ft. 6½ in. span welded beam crane aids in the repair of equipment, providing a swift, safe, economical method of handling.

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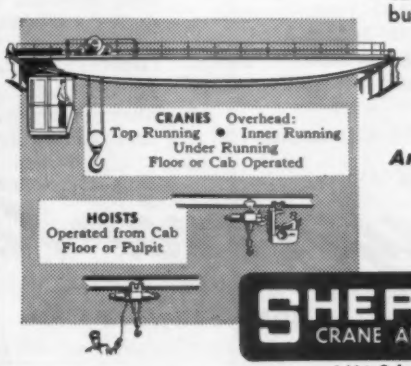

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Superior specializes in an unusually wide range of analyses, shapes and sizes

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A number of analyses in large OD thin wall seamless and Weldrawn® tubing are available at Superior. Stainless, carbon and alloy steels, beryllium copper, titanium, nickel and nickel alloys are offered in sizes up to 1⅛″ OD with .035″ wall maximum; Monel and certain analyses of stainless steel in sizes to 2½″ OD with .025″ wall maximum.

Superior tubing can be supplied in random, multiple or cut lengths up to 30 feet, and in any of three standard tempers (fully annealed, soft; half-hard drawn; full-hard drawn) or in special tempers required by Government, aircraft and customer specifications. Thin wall tubing can be shipped in special cardboard cylinders, to protect it from dents and scratches.

For additional information, get your free copy of Data Memorandum No. 4. Write to Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

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The Iron Age SUMMARY . . .

Rising costs build up pressure on steel price structure . . . Extras under constant scrutiny . . . Production problems plague auto producers . . . Overall demand strong.

Price Pressure . . . Higher production and raw material costs are building up terrific pressure on the steel price structure. Last summer's post-strike price boost may prove to have been inadequate to offset higher costs.

There's not much chance of another base price increase before next July when the second phase of the new steel labor contract takes effect. But steel price extras are under continuous study and will be watched even more closely during the next several months. If costs get out of hand, upward revision of price extras —the charge made by the mills for additional operations or special quality — would be one way of increasing revenues. Nothing is likely to happen before end of the year.

Meanwhile, production problems are continuing to plague automotive producers, reducing their "take" of cold-rolled sheets and other steel products. Once the production bugs are ironed out, Detroit will bear down on steel producers. This means they will be in the steel market strong in first quarter.

Record Production . . . Lack of demand from Detroit has resulted in a mild softening of the cold-rolled sheet market. But steel mills are producing at a record-breaking pace for the simple reason that the slack is being taken up by the demand for hot-rolled sheets and other products.

Overall demand for steel—particularly plates, structurals, and bars—is such that incoming orders have run 8 to 15 pct ahead of shipments during the last few weeks. And there's no sign of a letup.

Heavy order carryovers into 1957 are a certainty on some products. Mills that have opened first quarter order books report commitments running strong. One mill says cold-rolled sheets are already well committed for the first two months. Carryovers and strong demand from Detroit will tighten the market considerably.

Delicate Subject . . . The price situation is a delicate one for the steel companies. Increased raw material costs, especially scrap and coal, are squeezing profit margins. Last summer's strike on the ore boats is forcing expensive all-rail shipments to build up winter stockpiles. Other costs also have risen.

On the other hand, producers are not going to boost prices—either base or extras—willy-nilly. If and when they do, they'll be armed with strong arguments to beat off criticism.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,511	2,511	2,511	2,320
Ingot Index				
(1947-1949=100)	156.3	156.3	156.3	153.0
Operating Rates				
Chicago	102.0	103.0*	111.0	98.5
Pittsburgh	101.0	101.0*	102.0	102.0
Philadelphia	107.5	106.5	104.0	103.0
Valley	98.0	99.0*	99.0	98.0
West	103.0	104.0*	105.0	100.0
Detroit	104.0	105.0	102.0	94.0
Buffalo	105.0	105.0	105.0	105.0
Cleveland	103.0	107.5*	107.0	104.0
Birmingham	96.0	96.0	96.0	94.0
S. Ohio River	86.0	83.0*	91.0	93.0
Upper Ohio R.	104.0	107.0*	107.0	101.0
St. Louis	105.0	94.5	100.0	106.0
Northeast	100.0	100.0	100.0	72.0
Aggregate	102.0	102.0	102.0	100.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.622	5.622	5.622	5.174
Pig Iron (Gross Ton)	$63.04	$63.04	$63.04	$59.09
Scrap, No. 1 hvy (gross ton)	$57.50	$56.83	$57.33	$44.50
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	24.40
Copper, electrolytic	40.00	40.00	40.00	43.00
Lead, St. Louis	15.80	15.80	15.80	15.30
Magnesium ingot	36.00	36.00	36.00	33.25
Nickel, electrolytic	64.50	64.50	64.50	64.50
Tin, Straits, N. Y.	108.25	107.25	103.00	96.625
Zinc, E. St. Louis	13.50	13.50	13.50	13.00

*Revised

Wire Pricing Reaction Mixed

Recent changes made in quantity and commodity extras for merchant wire products popular with producers, less so with wholesalers . . . Some ore rail rates equalized.

◆ STORM in the wire products industry over the new pricing system seems to be clearing and it looks as though the wire companies will have stuck to their guns, with the jobbers having to make an adjustment.

When American Steel & Wire led off by announcing that quantity and commodity extras would be included in a new single pricing system, in effect adding a new extra to the old wholesaler price, the fat was in the fire. The new system had been under study for several years before its inauguration. It was not a "fly by night" scheme.

A wire producer would view the new system in this light: it will put the jobber back in the merchant product business. To take advantage of the lower prices, big jobbers must buy less frequently and in larger tonnages of single items.

The wholesaler, who's been plagued by a rush of smaller wholesale firms during the past several years, including a number that were selling at low profit margins could say: "Now this little guy can buy at the same price as the wholesaler. Everybody pays the same price. The larger retailer, if he hoards up orders, can buy merchant products in lots and get them for the same price which the wholesaler used to pay. In effect, this big retailer becomes a small wholesaler, adding to an already difficult burden."

The steel company's counter argument is this: The big jobber has always bought in large quantities, large enough to take our quantity discounts. If he hasn't, then he's been cultivating small-order business and passing the burden of the additional cost of small-order business on to the mill. Now he'll have to buy big, order less frequently but in larger quantities, and simply because he is bigger and has a higher volume than the large retailer or small wholesaler, he'll continue to buy at the lower, large quantity price.

The storm at the wholesaler level is not abating however. Several large firms have dropped merchant products from their line. Others talk of importing foreign material. Others are seeking new mill suppliers.

IRON ORE . . . Imported iron ore moving by rail from the ports of New York, Philadelphia, and Baltimore to the steel producing area around **Youngstown**, now will carry equal freight rates.

New decision by Interstate Commerce Commission to place the rates on equal footing is the latest action in the contest carried on by these ports for the bulk of the ore imports. Rail lines serving New York and Philadelphia had fought hard to get their rates lowered to the level applying on shipments from Baltimore, previously enjoying a preferential rate of 20 cents a ton.

Purchasing Agent's Checklist:

SPECIAL REPORT: Aerial surveying has growing industrial uses . . p. 51

RESEARCH: Problem of transformer size gets study . . . . . p. 53

BUSINESS: Diemakers see no sales peak yet . . . . . p. 55

MANUFACTURING: Standardization can be a valuable cost cutting aid . . . . . p. 59

MARKETING: Enameling industry is finding new markets . . . . . p. 60

MACHINE TOOLS: Do thread standards need revamping? . . p. 77

PRICE CHANGES . . . Increases of 10¢ per base box on tin mill prices, previously announced by many major producers, went into effect Nov. 1. U. S. Steel has advanced prices on two grades of stainless steel—type 304L was moved up .05¢ a lb and type 316L by .01¢ a lb.

Increases of .10¢ per base box on tin mill products have been listed by the U. S. Steel Export Co., also effective Nov. 1.

PLATE . . . Suez Canal crisis could seriously compound the current tight market in heavy steel plate, states Charles Lukens Huston, Jr., president of Lukens Steel Co.

Discussing future demand for plate he declared, "One measure of Suez's potential impact upon heavy plate producers is the government program for building 50 super-tankers. Such a program would suddenly create a need for some 750,000 tons of heavy steel plate from an industry already operating at capacity. This amount of steel is one-and-one-half times the tonnage that the present ship-building program is taking this year."

SHEET AND STRIP . . . In **Cleveland** one producer opened first quarter order books and already looks to almost a full book. Some November softness will permit turning out light coiled plate. December order books are loaded because of heavy ordering for automotive plants.

Solid booking for rest of the year on most flat rolled products is reported at one **Pittsburgh** mill. There's a little space on cold-rolled strip but sheet capacity has been committed. Automotive buying pressure is light.

Warehouses at **Chicago** continue to complain about cold-rolled sheet business. Hot-rolled sheet is in conversion.

BAR . . . Hot-rolled bars still showing a good balance between supply and demand at **Pittsburgh**. Mills are booked solidly for fourth quarter even without any pressure from carmakers.

Forging bar market at **Detroit** is almost as tight as the hot-rolled sheet market. Shortage is terrific with small sizes of carbon bars being very hard to locate.

At **Cleveland** hot-rolled bar market is tight with the producers predicting they could sell twice the amount being turned out.

Comparison of Prices

(Effective Oct. 30, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Oct. 30 1956	Oct. 23 1956	Oct. 2 1956	Nov. 1 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870	6.870	6.29
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	9.30
Stainl's C-R strip (No. 302)	47.50	47.50	47.50	44.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.85	$9.85	$9.85	$9.05
Tinplates, electro (0.50 lb.)	8.55	8.55	8.55	7.75
Special coated mfg. ternes	9.10	9.10	9.10	7.85
Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	40.75	40.75	40.75	38.25
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.25¢
Rails: (per 100 lb.)				
Heavy rails	$5.075	$5.075	$5.075	$4.725
Light rails	6.00	6.00	6.00	5.65
Semifinish Steel: (per net ton)				
Rerolling billets	$74.00	$74.00	$74.00	$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.225	4.225	4.225	4.225
Finished Steel Composite: (per pound)				
Base price	5.622¢	5.622¢	5.622¢	5.174¢

	Oct. 30 1956	Oct. 23 1956	Oct. 2 1956	Nov. 1 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$67.76	$67.76	$67.76	$63.69
Foundry, Valley	63.00	63.00	63.00	59.00
Foundry, Southern Cin'ti	67.17	67.17	67.17	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	63.00	63.00	63.00	59.00
Basic del'd Philadelphia	66.84	66.84	66.84	62.77
Basic Valley furnace	62.50	62.50	62.50	58.50
Malleable, Chicago	63.00	63.00	63.00	59.00
Malleable, Valley	63.00	63.00	63.00	59.00
Ferromanganese, cents per lb‡	11.75¢	11.75¢	10¾-11¾¢	9.50¢
74 to 76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$63.04	$63.04	$63.04	$59.09
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$57.50	$57.50	$57.50	$44.50
No. 1 steel, Phila. area	57.50	56.50	57.00	46.50
No. 1 steel, Chicago	57.50	56.50	57.50	42.50
No. 1 bundles, Detroit	56.50	56.50	56.50	39.00
Low phos., Youngstown	65.50	64.50	65.50	49.00
No. 1 mach'y cast, Pittsburgh	59.50	59.50	60.50	50.50
No. 1 mach'y cast, Philadel'a	58.00	58.00	58.00	48.50
No. 1 mach'y cast, Chicago	56.50	56.50	58.50	52.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$57.50	$56.83	$57.33	$44.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50	$14.50	$14.50	$14.25
Foundry coke, prompt	$17-18	$17-18	$17-18	$16.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	40.00	40.00	40.00	43.00
Copper, Lake, Conn.	40.00	40.00	40.00	43.00
Tin, Straits, New York	108.25†	107.25	103.00	96.625
Zinc, East St. Louis	13.50	13.50	13.50	13.00
Lead, St. Louis	15.80	15.80	15.80	15.30
Aluminum, virgin ingot	27.10	27.10	27.10	24.40
Nickel, electrolytic	64.50	64.50	64.50	64.50
Magnesium, ingot	36.00	36.00	36.00	33.25
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	64.50	65.00	65.50	66.00	.....
Birdsboro, Pa. *B6*	64.50	65.00	65.50	66.00	.....
Birmingham *R3*	58.50	59.00*	.....	.....	.....
Birmingham *W9*	58.50	59.00*	63.00	.....	.....
Birmingham *U4*	58.50	59.00*	63.00	.....	.....
Buffalo *R3*	62.50	63.00	63.50	64.00	.....
Buffalo *H1*	62.50	63.00	63.50	.....	.....
Buffalo *W6*	62.50	63.00	63.50	64.00	.....
Chester *P2*	64.50	65.00	65.50	.....	.....
Chicago *I4*	62.50	63.00	63.00	63.50	.....
Cleveland *A5*	62.50	63.00	63.00	63.50	67.50†
Cleveland *R3*	62.50	63.00	63.00	63.50	.....
Duluth *I4*	62.50	63.00	63.00	63.50	67.50†
Erie *I4*	62.50	63.00	63.00	63.50	67.50†
Everett *M6*	.....	63.75	64.25	.....	.....
Fontana *K1*	70.00	70.50	.....	.....	.....
Geneva, Utah *C7*	62.50	63.00	.....	.....	.....
Granite City *G2*	64.40	64.90	65.40	.....	.....
Hubbard *Y1*	.....	.....	63.00	.....	.....
Lone Star *L3*	58.50‡	59.00‡	.....	.....	.....
Midland *C11*	62.50	.....	.....	.....	.....
Minnequa *C6*	64.50	65.00	65.50	.....	.....
Monessen *P6*	62.50	.....	.....	.....	.....
Neville Is. *P4*	62.50	63.00	63.00	63.50	67.50†
N. Tonawanda *T1*	.....	63.00	63.50	64.00	.....
Pittsburgh *U1*	62.50	.....	63.00	63.50	.....
Sharpsville *S3*	62.50	63.00	63.00	63.50	.....
So. Chicago *R3*	62.50	63.00	63.00	.....	.....
Steelton *B3*	64.50	65.00	65.50	66.00	70.50
Swedeland *A2*	64.50	65.00	65.50	65.50	.....
Toledo *I4*	62.50	63.00	63.00	63.50	.....
Troy, N. Y. *R3*	64.50	65.00	65.50	66.00	.....
Youngstown *Y1*	.....	.....	63.00	63.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. * Add $1.00 for 0.31-0.69 pct phos. † Intermediate low phos. ‡ Add $1.00 for 0.31 to 0.50 pct phos.

Silvery iron: Buffalo, *H1*, $72.50; Jackson, *J1*, *I4* (Globe Div.), $71.50; Niagara Falls (15.01-15.50), $99.50; Keokuk (14.01-14.50), $102.00; (15.51-16.00), $105.00. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 14 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon: $44.00.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

←To identify producers, see Key on P. 148→

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	19.75	21.00	20.50	22.00	—	23.25	35.25	28.25	32.75	—	16.00	27.75	16.25
Slabs, billets	24.50	27.25	25.25	28.00	28.50	29.25	44.50	35.75	42.00	—	20.75	—	21.00
Billets, forging	—	33.00	33.75	34.00	37.00	36.00	56.25	42.25	50.25	30.75	27.25	27.75	27.75
Bars, struct.	39.00	39.25	40.50	40.75	43.75	43.00	66.75	50.25	59.00	36.25	32.50	33.00	33.00
Plates	—	41.25	42.50	43.00	45.50	45.75	70.25	54.50	63.75	38.75	33.75	35.50	34.50
Sheets	45.00	45.25	47.25	47.50	55.75	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Strip, hot-rolled	33.00	35.75	34.00	36.75	—	39.75	63.50	48.75	58.25	—	29.75	—	30.75
Strip, cold-rolled	41.50	45.25	43.75	47.50	52.00	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	37.25	38.35	38.75	41.50	40.75	63.50	48.00	56.25	34.50	31.00	31.50	31.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Philadelphia, *D5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (.25 per lb. higher); New Bedford, Mass., *R6;* Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5;* Gary, *U1.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Philadelphia, *D5;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forgings billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3.* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1.*

IRON AND STEEL SCRAP MARKETS

Market Continues to Rebound

New strength is evident in most markets . . . Composite climbs with new purchases . . . No. 2 grades are stronger with significant price increases . . . Demand strong.

◆ CONTINUED strong and firm, with no weakness in sight for the immediate future, is the tone of the scrap market. The scrap picture in most major markets remains unchanged, with some upward revisions the only action on the price front.

Price increases are not sensational, confined to no more than $1 to $2 in most cases. But the continued high level of prices and bullish factors in most markets indicates a high level of prices for some time.

Industrial lists continued to bring higher prices, indicating that the increased tonnage is still not sufficient to bring a downward trend to the market. In fact, some speculative bidding on industrial scrap indicates sentiment in the trade that an even tighter market will develop in winter months.

Dealers report that they are having a difficult time building up inventories, and higher prices in No. 2 grades indicates difficulty in obtaining material in those grades at that price. It also indicates that in view of near record prices for No. 1 grades, consumers are relying on purchases of No. 2 steel and bundles to keep their scrap costs down as far as possible.

In response to the continued strength, THE IRON AGE Composite Price rose again to $57.50, up from $56.83, but still below the record high of $58.83 set in September. While mill inventories are high, there is no distress apparent, which tends to forestall a runaway market. However, continued high operating rate, a possible shortage of ore, and further tightening of the steel market ahead indicate no weakening of the market in weeks ahead. Scrap generation is not a factor either way.

Pittsburgh . . . A purchase by a major mill has confirmed the price of No. 1 heavy melting scrap at $58. The same purchase raised the prices of No. 2 grades by $1. The price of turnings was also confirmed by new mill action. The entire market is firm, with No. 2 grades particularly tight, since the price structure has tended to dry up the supply of this grade. Prices of random rails has moved down after culling of higher priced material.

Chicago . . . Scrap continued tightening in this area, as outlying mills continue to boost prices and drain off material that would normally flow into the district at this time of year. As a result, despite a scattering of hold orders and relative inactivity by the larger mills, purchase prices paid smaller producers continue to rise and scrap inventories at the mill level show no great overall gains. Normally, fall buying is aimed at building strong inventories for the winter months.

Philadelphia . . . No. 1 steelmaking grades advanced $1 to $58 following the pattern set last week in Pittsburgh and Chicago. At least three mill purchases were made at this price. The price of No. 2 bundles pushed forward $2 on the basis of a large mill order. A similar increase materialized for rail crops 18 in. and under. Otherwise, the market remained firm. Exports continued active.

New York . . . New monthly purchases brought prices of No. 2 heavy melting up $1. Higher price reflects the continued high operating rate, strong demand, and emphasis on No. 2 grades to hold down scrap costs.

Detroit . . . The market continues firm. Bidding on the first auto lists was a shade higher than a month ago, but not enough to change dealer prices. Mills have not purchased local scrap, but no major variation from current levels is indicated when they enter the market.

Cleveland . . . The market in both Cleveland and the Valley took on a firmer tone as major buyers held off until auto lists were sold. Slight increases in line with the Detroit trend are expected. Dealer yards are fairly clean and feeling is bullish with no piling at present prices. Some brokers are already bidding up some lists, with one in the Valley reportedly going for over $68.

Birmingham . . . There is a generally firmer tone to the steel scrap market in this district, but cast continues to appear weak. Most consumers apparently have good inventories and are buying only enough to replace what is used, paying previously quoted prices. But dealers are having a hard time building their own inventories because of slow collections. Exporters are buying in the Carolinas and Georgia on the basis of price cuts announced a week ago.

St. Louis . . . The market continues strong in this area. Mills are able to obtain their requirements and want to keep the material rolling in view of the high operating rate and the prospect of reduced shipments when cold weather comes. Turnings and borings are up on local and outside buying. Rerolling consumers, who reduced prices $5 a week ago, found it necessary to restore the cut to obtain material.

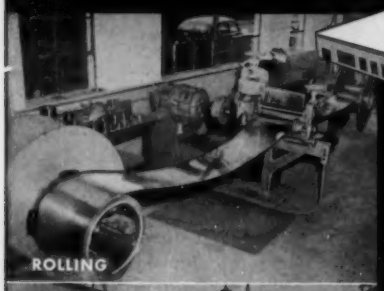
Cincinnati . . . Mills are sitting comfortably with healthy inventories and hope to stave off the increase in area's industrial lists. But the market is strong and so are chances of price increases. Steel foundry activity is high, but gray iron foundry business is off.

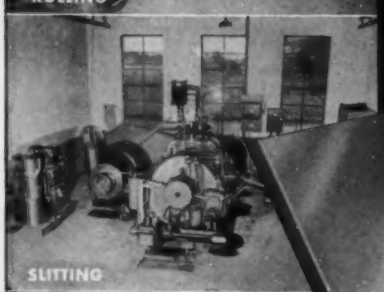
Buffalo . . . Prices of No. 2 steelmaking grades dropped $1 on the basis of purchases by the area's major mill. Old orders have just about been cleared up. Scrap yards still have scanty supplies, bolstering the price levels for most products.

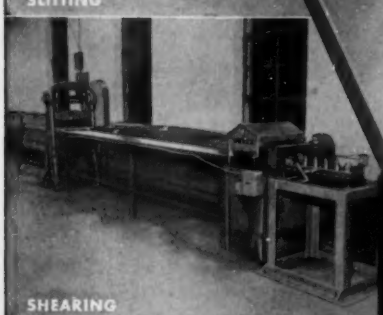
Boston . . . The market is relatively unchanged, with slightly more activity but little change in prices. Export is still down, not only because of demand, but also because of lack of freight cars and facilities to ship.

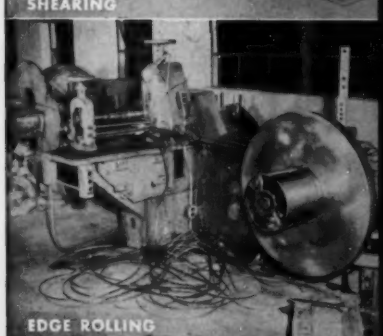
West Coast . . . Mills report scrap receipts are good. Although the tight freight car situation hasn't pinched scrap shipments yet, the squeeze will be felt if the situation gets any worse. Export continues strong.

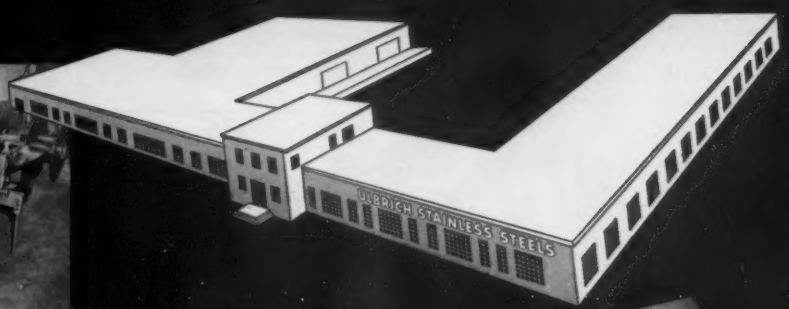
the biggest little mill in the country











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Scrap Prices *(Effective Oct. 30, 1956)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	50.00 to 51.00
No. 1 bundles	57.00 to 58.00
No. 2 bundles	47.00 to 48.00
Machine shop turn.	39.00 to 40.00
Mixed bor. and ms. turn.	39.00 to 40.00
Shoveling turnings	44.00 to 45.00
Cast iron borings	44.00 to 45.00
Low phos. punch'gs plate	68.00 to 69.00
Heavy turnings	55.00 to 56.00
No. 1 RR. hvy. melting	67.00 to 68.00
Scrap rails, random lgth.	78.00 to 79.00
Rails 2 ft and under	79.00 to 80.00
RR. steel wheels	73.00 to 74.00
RR. spring steel	73.00 to 74.00
RR. couplers and knuckles	73.00 to 74.00
No. 1 machinery cast	59.00 to 60.00
Cupola cast	51.00 to 52.00
Heavy breakable cast.	49.00 to 50.00

Chicago

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 factory bundles	65.00 to 66.00
No. 1 dealers' bundles	56.00 to 57.00
No. 2 dealers' bundles	41.00 to 42.00
Machine shop turn.	37.00 to 38.00
Mixed bor. and turn.	39.00 to 40.00
Shoveling turnings	39.00 to 40.00
Cast iron borings	39.00 to 40.00
Low phos. forge crops	70.00 to 71.00
Low phos. punch'gs plate	67.00 to 68.00
Low phos. 3 ft and under	66.00 to 67.00
No. 1 RR. hvy. melting	65.00 to 66.00
Scrap rails, random lgth.	74.00 to 75.00
Rerolling rails	85.00 to 86.00
Rails 2 ft and under	84.00 to 85.00
Locomotive tires, cut	70.00 to 71.00
Cut bolsters & side frames	70.00 to 71.00
Angles and splice bars	75.00 to 76.00
RR. steel car axles	88.00 to 89.00
RR. couplers and knuckles	69.00 to 70.00
No. 1 machine cast	56.00 to 57.00
Cupola cast	51.00 to 52.00
Heavy breakable cast.	46.00 to 47.00
Cast iron brake shoe	47.00 to 48.00
Cast iron wheels	56.00 to 57.00
Malleable	69.00 to 70.00
Stove plate	47.00 to 48.00
Steel car wheels	70.00 to 71.00

Philadelphia Area

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 bundles	57.00 to 58.00
No. 2 bundles	47.00 to 48.00
Machine shop turn.	40.00 to 41.00
Mixed bor. short turn.	40.00 to 41.00
Cast iron borings	40.00 to 41.00
Shoveling turnings	44.00 to 45.00
Clean cast chem. borings	46.00 to 47.00
Low phos. 5 ft and under	61.00 to 62.00
Low phos. 2 ft and under	62.00 to 63.00
Low phos. punch'gs	62.00 to 63.00
Elec. furnace bundles	60.00 to 61.00
Heavy turnings	52.00 to 53.00
RR. steel wheels	69.00 to 70.00
RR. spring steel	69.00 to 70.00
Rails 18 in. and under	78.00 to 79.00
Cupola cast	52.00 to 54.00
Heavy breakable cast.	55.00 to 57.00
Cast iron car wheels	64.00 to 65.00
Malleable	68.00 to 69.00
Unstripped motor blocks	44.00 to 45.00
No. 1 machinery cast	57.00 to 59.00

Cleveland

No. 1 hvy. melting	$63.50 to $64.50
No. 2 hvy. melting	46.00 to 47.00
No. 1 bundles	63.50 to 64.50
No. 2 bundles	39.00 to 40.00
No. 1 busheling	63.50 to 64.50
Machine shop turn.	33.00 to 34.00
Mixed bor. and turn.	37.00 to 38.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	37.00 to 38.00
Cut struct'r'l & plates, 2 ft & under	64.50 to 65.50
Drop forge flashings	64.50 to 65.50
Low phos. punch'gs, plate	64.50 to 65.50
Foundry steel, 2 ft & under	56.00 to 57.00
No. 1 RR. heavy melting	65.00 to 66.00
Rails 2 ft and under	82.00 to 83.00
Rails 18 in. and under	83.00 to 84.00
Railroad grate bars	47.00 to 48.00
Steel axle turnings	43.00 to 44.00
Railroad cast	60.00 to 61.00
No. 1 machinery cast	57.00 to 58.00
Stove plate	54.00 to 55.00
Malleable	70.00 to 71.00

Youngstown

No. 1 hvy. melting	$64.00 to $65.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 bundles	64.00 to 65.00
No. 2 bundles	45.00 to 46.00
Machine shop turn.	34.00 to 35.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	40.00 to 41.00
Low phos. plate	65.00 to 66.00

Buffalo

No. 1 hvy. melting	$54.00 to $55.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 busheling	54.00 to 55.00
No. 1 bundles	54.00 to 55.00
No. 2 bundles	41.00 to 42.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	32.00 to 33.00
Low phos. plate	59.00 to 60.00
Scrap rails, random lgth.	57.00 to 58.00
Rails 2 ft and under	77.00 to 78.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	70.00 to 71.00
No. 1 machinery cast	52.00 to 53.00
No. 1 cupola cast	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$55.00 to $56.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles, openhearth	56.00 to 57.00
No. 2 bundles	35.00 to 36.00
New busheling	55.00 to 56.00
Drop forge flashings	54.50 to 55.50
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00
Low phos. punch'gs, plate	55.00 to 56.00
No. 1 cupola cast	51.00 to 52.00
Heavy breakable cast.	44.00 to 45.00
Stove plate	45.00 to 46.00
Automotive cast	54.00 to 55.00

St. Louis

No. 1 hvy. melting	$52.00 to $53.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 bundles	55.00 to 56.00
No. 2 bundles	41.00 to 42.00
Machine shop turn.	35.50 to 36.50
Cast iron borings	37.50 to 38.50
Shoveling turnings	37.50 to 38.50
No. 1 RR. hvy. melting	62.50 to 63.50
Rails, random lengths	77.00 to 78.00
Rails 18 in. and under	83.00 to 84.00
Locomotive tires uncut	64.00 to 65.00
Angles and splice bars	68.00 to 69.00
Std. steel car axles	78.00 to 79.00
RR. specialties	66.50 to 67.50
Cupola cast	52.00 to 53.00
Heavy breakable cast.	44.50 to 45.50
Cast iron brake shoes	50.00 to 51.00
Stove plate	44.00 to 45.00
Cast iron car wheels	56.00 to 57.00
Rerolling rails	89.00 to 90.00
Unstripped motor blocks	43.00 to 44.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$48.00 to $49.00
No. 2 hvy. melting	37.00 to 37.50
No. 1 bundles	48.00 to 49.00
No. 2 bundles	35.50 to 36.00
No. 1 busheling	48.00 to 49.00
Elec. furnace, 3 ft & under	51.00 to 52.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and short turn.	31.00 to 32.00
Shoveling turnings	32.00 to 33.00
Clean cast chem. borings	34.00 to 35.00
No. 1 machinery cast	45.00 to 46.00
Mixed cupola cast	41.00 to 42.00
Heavy breakable cast.	44.00 to 45.00
Stove plate	39.00 to 40.00
Unstripped motor blocks	32.00 to 33.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	42.00 to 43.00
No. 2 bundles	40.00 to 41.00
Machine shop turn.	31.00 to 32.00
Mixed bor. and turn.	31.00 to 32.00
Shoveling turnings	37.00 to 38.00
Clean cast chem. borings	35.00 to 36.00
No. 1 machinery cast	51.00 to 52.00
Mixed yard cast.	47.00 to 48.00
Charging box cast.	47.00 to 48.00
Heavy breakable cast.	47.00 to 48.00
Unstripped motor blocks	37.00 to 38.00

Birmingham

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	42.00 to 43.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	33.00 to 34.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	25.00 to 26.00
Electric furnace bundles	52.00 to 53.00
Bar crops and plate	59.00 to 60.00
Structural and plate, 2 ft	57.00 to 58.00
No. 1 RR. hvy. melting	56.00 to 57.00
Scrap rails, random lgth.	69.00 to 70.00
Rails, 18 in. and under	74.00 to 75.00
Angles & splice bars	68.00 to 69.00
Rerolling rails	77.00 to 78.00
No. 1 cupola cast	53.00 to 54.00
Stove plate	51.00 to 52.00
Charging box cast.	40.00 to 41.00
Cast iron car wheels	45.00 to 46.00
Unstripped motor blocks	46.00 to 47.00
Mashed tin cans	15.00 to 16.00
Elec. furnace, 3 ft & under	50.00 to 51.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$56.00 to $57.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 bundles	56.00 to 57.00
No. 2 bundles	41.00 to 42.00
Machine shop turn.	36.00 to 37.00
Mixed bor. and turn.	36.00 to 37.00
Shoveling turnings	39.00 to 40.00
Cast iron borings	36.00 to 37.00
Low phos. 18 in. & under	63.00 to 64.00
Rails, random lengths	69.00 to 70.00
Rails, 18 in. and under	76.00 to 77.00
No. 1 cupola cast	48.00 to 49.00
Hvy. breakable cast.	47.00 to 48.00
Drop broken cast.	58.00 to 59.00

San Francisco

No. 1 hvy. melting	$55.00
No. 2 hvy. melting	52.00
No. 1 bundles	53.00
No. 2 bundles	43.00
Machine shop turn.	35.00
Cast iron borings	35.00
No. 1 RR. hvy. melting	55.00
No. 1 cupola cast	60.00

Los Angeles

No. 1 hvy. melting	$57.00
No. 2 hvy. melting	54.00
No. 1 bundles	55.00
No. 2 bundles	44.00
Machine shop turn.	35.00
Shoveling turnings	38.00
Cast iron borings	35.00
Elec. furn. 1 ft and under (foundry)	66.00
No. 1 RR. hvy. melting	57.00
No. 1 cupola cast	60.00

Seattle

No. 1 hvy. melting	$55.00
No. 2 hvy. melting	52.00
No. 2 bundles	33.00
No. 1 cupola cast	55.00
Mixed yard cast.	55.00

Hamilton, Ont.

No. 1 hvy. melting	$52.00
No. 2 hvy. melting	47.00
No. 1 bundles	52.00
No. 2 bundles	40.50
Mixed steel scrap	46.00
Bushelings	39.50
Bush., new fact., prep'd	50.00
Bush., new fact., unprep'd	46.00
Machine shop turn.	31.00
Short steel turn.	35.00
Mixed bor. and turn.	28.00
Rails, rerolling	60.00
Cast scrap	50.00

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IN IRON & STEEL SCRAP
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EXPORTS-IMPORTS **LIVINGSTON & SOUTHARD, INC.** 99 Park Ave., New York, N. Y. *Cable Address:* FORENTRACO

Producers Copper Price Is 36c

All of the Big 3 copper producers yield to oversupply and cut price to 36¢ . . . Still highest price among major markets . . . Expect drop to strengthen demand.

◆ DOMESTIC copper producers finally yielded to the pressure of lower prices on all other copper markets, plus a continuing oversupply to reduce their copper price by 4¢ per lb., from 40¢ to 36¢.

Phelps Dodge, the only one of the Big 3 copper producers without tentacles overseas, led the downward move with its new price effective Oct. 25. The next day Kennecott went along, and Anaconda made it unanimous on Oct. 29.

The world copper price setup now looks something like this:

U. S. Producers	36.00
Custom Smelters	35.00
Lake, delivered	36.00
Canadian producers	35.00
(Canadian currency)	
Katanga (Belgian Congo)	34.20
Rhodesian Selection Trust	33.125
London Metals Exchange	34.50

This is closest the world's copper producers and sellers have been to the long sought one-world price for many months. The difference between the high price and the low price is less than 3¢, and in effect even less because RST copper is sold f.o.b. London. However, it appears that the tendency will be toward a bigger spread.

The only immediate possibility of strength seems to lie in favor of the highest price—U. S. producers. Demand thus far this fall has been disappointing. One of the major theories advanced as explanation was that industry might be holding back in hopes of the price cut. If this is so demand should pick up.

Two of the three producers have announced that they will further encourage a better balance by reducing their production.

Phelps Dodge will drop back to working 12 of 14 days, from previous 26 of 28 output by about 7½ pct, or about 1850 tons per month.

Anaconda will reduce production by 2000 tons per month, about 16 pct, by cutting out all holiday and overtime work.

On the other hand, there is a good chance that markets featuring the lower copper price may experience even more weakening. Most of these are located in London or on the continent. They include a great deal of metal from Chile, where production is continuing full speed ahead. And some will soon include 36,000 tons of copper being sold by the British government. At present there seems to be no indication that demand will pick up to match the potentially bigger supply.

The one advantage held by the lower price group is the matter of the breakeven point past which copper cannot be mined and refined profitably. According to R. L. Prain, Chairman of RST, his company operating in Africa has a breakeven point near 26¢ per lb. The U. S. producers with much higher wages and operating costs must in effect use a sliding scale. Some ore which can be mined profitably when copper is 40¢ must be ignored at 36¢. And even some of the richest domestic ore will not pay for itself much below 30¢.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum ingot	27.10	25.90	8/10/56
Aluminum pig	25.00	24.00	8/10/56
Copper (P)	36.00	40.00	10/26/56
Copper (CS)	35.00	37.00	10/22/56
Lead, E. St. L.	15.80	16.30	1/13/56
Lead, N. Y.	16.00	16.50	1/13/56
Magnesium ingot	38.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	64.50	60.00	11/24/54
Silver	91.375	91.00	10/17/56
Titanium sponge	270-300	295-325	7/7/56
Zinc, E. St. L.	13.50	13.00	1/6/56
Zinc, N. Y.	14.00	13.50	1/66/5

ALUMINUM: 99% ingot frt allwd. **COPPER:** (P) = producers, (CS) = custom smelters, electrolytic. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig. Velasco, Tex. **NICKEL:** Port Colbourne, Canada. **SILVER:** ingots, ¢ per troy oz. **ZINC:** prime western. **TIN:** see column at right, other primary prices, pg. 144.

ALUMINUM . . . Frank R. Nichols, president of Nichols Wire and Aluminum Co., Davenport, Iowa, told members of the Wire Assn. Annual Conference, Pittsburgh, that the use of a continuous process for casting aluminum re-draw rod is increasing in underdeveloped countries as well as this country.

The Italian-invented Properzi Process now turns out 400,000 lb of aluminum rod per shift at various installations throughout the world. The process converts aluminum pig or ingot into rod.

It is considered attractive to underdeveloped countries because of the relatively low investment required.

V.G.G Nayar, general manager of India's Aluminum Industries Ltd., his country's largest cable manufacturing firm, told the gathering that he has increased output 50 pct through the installation of a Properzi unit. He plans to put in a second unit.

In addition to the nine machines currently in operation in this country, there are units in South Africa, Spain, Mexico and Ireland.

TIN . . . Trading was unusually slow with most of the traders waiting for the outcome of incidents which could affect the market. In Singapore there are riots caused by a number of Red Front unions.

And the heightening of tensions in the Middle East, around the Suez Canal area is being viewed with some alarm. If this crisis passes without further open animosity, it could spell the end of the artificial shortage caused by the Suez bottleneck.

Prices for the week: Oct. 24—105.75; Oct. 25—106.25; Oct. 26—106.25; Oct. 29—107.75; Oct. 30—108.25.

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MANUALLY OPERATED CABLE HOIST
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Lifts, pulls or lowers 6 tons or more when rigged with tackle blocks.

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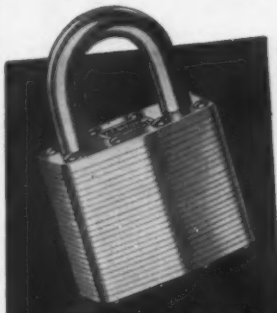

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Multiple steel plates . . . stronger than a solid block! Genuine brass-cylinder, pin-tumbler security. No finer padlock protection!

STAINLESS STEEL COMBINATION PADLOCKS

Double-wall construction . . . 3 number brass locking mechanism. Available with "Key-Control" — one control key opens all locks.

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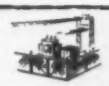
TOOL CRIBS

STOCK ROOMS

GATES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Master's complete line offers you the world's finest padlock security . . . *for every protection need!*

Here are just a few of the Master features and services that make your protection problems easier:

- Special long or short shackle styles.
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STEEL CASTINGS
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SAND OR SHELL MOLDED

"C" Steel Castings—sand or shell molded—possess qualities far more interesting than the mere strength of steel. For, in addition to strength they provide more efficient design—better weight-strength ratio—and greater fatigue resistance, i.e., longer life and less replacement. Furthermore "C" Steel Castings, because they are truly foundry engineered from pattern to final casting, require minimum machining and provide better fit plus fast assembly.

If you are interested in castings, the know-how, experience and engineering knowledge of our staff are at your service upon request.

CRUCIBLE STEEL CASTING CO.
LANSDOWNE 1, PENNA.

Nonferrous Prices *(Effective Oct. 30, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–3.
1800, 1100, 3003	44.3	42.1	40.9	40.2
5052	51.8	46.8	45.1	42.9
6061-0	48.9	44.6	42.8	42.6

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6– 8	45.5–47.3	61.3–65.1
12–14	46.2–47.7	62.2–66.8
24–26	49.4–49.5	73.1–77.8
36–38	58.3–59.0	97.4–101.0

Screw Machine Stock—2011-T-3

Size*	¼	⅜–⅝	¾–1	1¼–1½
Price	59.7	58.8	57.4	55.2

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.352	$1.803	$2.254	$2.704
.024 gage	1.686	2.252	2.815	3.378

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250–3.00	.250–3.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	95.7	108.7	171. 3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

[A]Z91B (Die Casting) ..... 37.25 (delivered)
[a]Z63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	113	97	118
Strip, CR	111	99	128
Rod, bar, HR	94	80	99
Angles, HR	94	80	99
Plates, HR	107	96	111
Seamless tube	144	120	190
Shot, blocks	...	78	...

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.63	.....	54.86	57.82
Brass, 70/30	49.44	49.98	49.37	52.35
Brass, Low	52.65	53.19	52.59	55.46
Brass, R L	53.79	54.33	53.73	56.60
Brass, Naval	53.39	.....	47.70	56.55
Munts Metal	51.44	.....	47.25	.....
Comm. Bz.	55.48	56.02	55.42	58.04
Mang. Bz.	57.13	.....	51.23	.....
Phos. Bz. 5%	76.25	.....	76.75	.....

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $12.10-$12.60; alloy, $15.00-$15.75; Plate, HR, commercially pure, $10.00-$10.50; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.00-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.55-$7.80; alloy, $7.55-$7.75.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex. .. 33.50
Beryllium copper, per lb conta'd Be. $43.00
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Cobalt, 97-99% (per lb) ..... $2.60 to $2.67
Copper, Lake, delivered 40.00
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz. .. $ 2.25
Iridium, dollars per troy oz. .. $90 to $100
Magnesium, sticks, 100 to 500 lb. 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $255 to $257
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy oz. . $23 to $24
Platinum, dollars per troy oz. . $103 to $105
Zirconium sponge $10.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Calcium, small lots ..... $ 4.55
Chromium, 99.8% metallic basis .... $ 1.31
Germanium, per gm, f.o.b. Miami, Okla., refined $48.50
Lithium, 98% ..... $11.00 to $14.00
Rhodium ..... $120.00 to $125.00
Thorium, per kg $43.00
Uranium, normal per kg $40.00
U-235, per lb (nominal) $11,000
Vanadium ..... $ 3.45
*Tentative.

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 35.00
No. 120 ..... 33.75
No. 123 ..... 32.25
80-10-10 ingot
No. 305 ..... 38.50
No. 315 ..... 36.75
88-10-2 ingot
No. 210 ..... 48.75
No. 215 ..... 44.50
No. 245 ..... 40.00
Yellow ingot
No. 405 ..... 27.50
Manganese bronze
No. 421 ..... 30.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 26.50-27.25
0.60 copper max. 26.25-27.00
Piston alloys (No. 122 type) .. 26.00-27.00
No. 12 alum. (No. 2 grade) 23.75-25.00
108 alloy 24.00-25.00
195 alloy 26.50-27.00
13 alloy (0.60 copper max.) 26.25-27.00
AXS-679 ..... 24.00-25.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 24.25-25.00
Grade 2—92-95% 23.50-24.00
Grade 3—90-92% 22.75-23.50
Grade 4—85-90% 22.25-23.00

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	32	31¼
Yellow brass	24⅝	22⅝
Red brass	28½	27¾
Comm. bronze	29½	28¾
Mang. bronze	23½	22½
Yellow brass rod ends	24⅝	....

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 29
No. 2 copper wire 27½
Light copper 25¼
*Refinery brass 26
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 29
No. 2 copper wire 27½
Light copper 25¼
No. 1 composition 27¾
No. 1 comp. turnings 26¼
Hvy. yellow brass solids 18⅝
Brass pipe 19¼
Radiators 21¼

Aluminum

Mixed old cast. ..... 16 —16½
Mixed new clips ..... 17 —17½
Mixed turnings, dry ..... 16 —17

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 26 —26½
No. 2 copper wire ..... 24½—25
Light copper ..... 22 —22½
Auto radiators (unsweated) . 17½—18
No. 1 composition ..... 23½—24
No. 1 composition turnings ... 22 —22½
Cocks and faucets ..... 18 —18½
Clean heavy yellow brass .... 15 —15½
Brass pipe ..... 19 —19½
New soft brass clippings ..... 20½—21
No. 1 brass rod turnings ..... 18 —18½

Aluminum

Alum. pistons and struts ..... 6½— 7
Aluminum crankcases ..... 11½—12
1100 (2S) aluminum clippings 14½—15
Old sheet and utensils ..... 11½—12
Borings and turnings ..... 8 — 8½
Industrial castings ..... 11½—12
2024 (24S) clippings ..... 14½—15

Zinc

New zinc clippings ..... 7 — 7½
Old zinc ..... 4½— 5
Zinc routings ..... 2¾— 3
Old die cast scrap ..... 2½— 2¾

Nickel and Monel

Pure nickel clippings ..... $1.85-$1.95
Clean nickel turnings ..... $1.55-$1.65
Nickel anodes ..... $1.85-$1.95
Nickel rod ends ..... $1.85-$1.95
New Monel clippings 80-90
Clean Monel turnings 70-80
Old sheet Monel 70-80
Nickel silver clippings, mixed 21
Nickel silver turnings, mixed 18

Lead

Soft scrap lead ..... 12½—13
Battery plates (dry) ..... 7 — 7¼
Batteries, acid free 4¼

Miscellaneous

Block tin ..... 80 —81
No. 1 pewter ..... 62½—63
Auto babbitt ..... 42 —42½
Mixed common babbitt ..... 13 —13½
Solder joints ..... 18 —18½
Siphon tops 42
Small foundry type ..... 15½—15⅝
Monotype ..... 14⅝—15
Linotype and stereotype ..... 13 —13⅛
Electrotype ..... 12½—12⅝
Hand picked type shells .... 10 —10½
Linotype and stereo. dross ..... 5¼— 5⅜
Electro. dross ..... 4¼— 4½

IRON AGE

STEEL PRICES

(Effective Oct. 30, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			107.00 *B3*		5.05 *B3*	7.40 *B3*	5.05 *B3*						
	Buffalo, N. Y.	74.00 *B3, R3*	91.50 *B3, R3*	107.00 *B3, R3*	5.90 *B3*	5.05 *B3*	7.40 *B3*	5.05 *B3*	4.875 *B3, R3*	6.85 *R7*	6.95 *B3*			
	Claymont, Del.													14.55 *C11*
	Harrison, N. J.													
	Conshohocken, Pa.		96.50 *A2*	114.00 *A2*					4.725 *A2*	6.90 *A2*	6.95 *A2*			
	New Bedford, Mass.									7.30 *R6*				
	Johnstown, Pa.	74.00 *B3*	91.50 *B3*	107.00 *B3*		5.05 *B3*	7.40 *B3*							
	Boston, Mass.									7.40 *T8*				14.90 *T8*
	New Haven, Conn.									7.30 *D1*				
	Baltimore, Md.									6.85 *T8*				
	Phoenixville, Pa.					5.85 *P2*		5.85 *P2*						
	Sparrows Pt., Md.								4.675 *B3*		6.95 *B3*			
	Bridgeport, Wallingford, Conn.	79.00 *N8*	96.50 *N8*	107.00 *N8*						7.30 *W1* 6.95 *T8*				
	Pawtucket, R. I. Worcester, Mass.									7.48 *A5,N7*				14.90 *N7*
MIDDLE WEST	Alton, Ill.								4.875 *L1*					
	Ashland, Ky.								4.675 *A7*					
	Canton-Massillon, Dover, Ohio		94.00 *R3*	107.00 *R3, T5*						6.85 *G4*		10.10 *G4*		14.55 *G4*
	Chicago, Ill. Franklin Park, Ill.	74.00 *U1, R3*	91.50 *U1, R3,W8*	107.00 *U1, R3,W8*	5.90 *U1*	5.00 *U1, W8*	7.35 *U1,Y1* 6.00 *W8*	5.00 *U1*	4.675 *N4* 4.675 *A1*	6.95 *A1,T8*			7.75 *W8 S9*	14.55 *A1, S9,T8*
	Cleveland, Ohio									6.85 *A5,J3*			7.75 *J3*	
	Detroit, Mich.	74.00 *R5*		107.00 *R5*					4.775 *G3, M2*	6.95 *M2,G3, D2,P11*	7.05 *G3*	10.10 *G3, S1,D2*	7.05 *G3*	
	Anderson, Ind.									6.85 *G4*		10.10 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	74.00 *U1*	91.50 *U1*	107.00 *U1, Y1*	5.90 *I3*	5.00 *U1*	7.35 *U1,I3*	5.00 *I3*	4.675 *U1, I3,Y1*	5.85 *Y1*	6.95 *U1, I3,Y1*	10.20 *Y1*	7.75 *U1, Y1*	
	Sterling, Ill.	74.00 *N4*							4.775 *N4*					
	Indianapolis, Ind.									7.90 *C5*				
	Newport, Ky.												7.75 *N5*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		91.50 *S1, C10*	107.00 *S1, C10*					4.675 *S1, R3*	6.85 *T4*	6.95 *S1, R3*	10.00 *S1, R3*	7.75 *S1*	14.55 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	74.00 *U1, J3*	91.50 *U1, J3,C11*	107.00 *U1, C11*	5.90 *U1*	5.00 *U1, J3*	7.35 *U1, J3*	5.00 *U1*	4.675 *P6*	5.750 *P6* 6.85 *J3,B4, S7*			7.75 *S9*	14.55 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.00 *W3*			4.675	6.85 *W3,F3*	6.95 *W3*	9.65 *W3*		
	Youngstown, Ohio	74.00 *R3*	91.50 *Y1, C10*	107.00 *Y1*		5.00 *Y1*	7.35 *Y1*		4.675 *U1, Y1*	6.85 *Y1,C5*	6.95 *U1, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
WEST	Fontana, Cal.	83.50 *K1*	101.00 *K1*	128.00 *K1*		5.70 *K1*	8.05 *K1*	5.85 *K1*	5.475 *K1*	8.50 *K1*				
	Geneva, Utah	91.50 *C7*				5.00 *C7*	7.35 *C7*							
	Kansas City, Mo.					5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			
	Los Angeles, Torrance, Cal.		101.00 *B2*	127.00 *B2*		5.70 *C7, B2*	8.05 *B2*		5.425 *B2, C7*	8.80 *C1*			8.95 *B2*	
	Minnequa, Colo.					5.30 *C6*			5.775 *C6*					
	Portland, Ore.					5.75 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		101.00 *B2*			5.65 *B2*	8.00 *B2*		5.425 *C7,B2*					
	Seattle, Wash.		105.00 *B2*			5.75 *B2*	8.10 *B2*		5.675 *B2*					
SOUTH	Atlanta, Ga.								4.875 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	74.00 *T2*	91.50 *T2*			5.00 *T2,R3* 5.30 *C16*	7.35 *T2*		4.675 *T2,R3* 4.975 *C10*		6.95 *T2*			
	Houston, Lone Star, Texas	80.00 *L3*	96.50 *S2*	112.00 *S2*		5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			

STEEL PRICES

(Effective Oct. 30, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.675 *B3*	5.75 *B3*				6.90 *B3*	8.525 *B3*			5.80 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct .2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		
	Claymond, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.725 *A2*	5.80 *A2*				6.95 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.80 *B3*			
	Fairless, Pa.	4.725 *U1*	5.80 *U1*				6.95 *U1*	8.575 *U1*				$9.70 *U1*	$8.40 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.675 *B3*	5.75 *B3*	6.30 *B3*			6.90 *B3*	8.575 *B3*	9.275 *B3*		5.90 *B3*	$9.70 *B3*		
	Worcester, Mass.										6.10 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.00 *L1*			
	Ashland, Ky.	4.675 *A7*		6.30 *A7*	6.325 *A7*									
	Canton-Massillon, Dover, Ohio			6.30 *R3,R1*										
	Chicago, Joliet, Ill.	4.675 *W8, A1*					6.90 *U1*			5.80 *K2*	5.80 *A5,R3, N4,W8, K2*			
	Sterling, Ill.										5.90 *N4, K2*			
	Cleveland, Ohio	4.675 *J3, R3*	5.75 *J3, R3*		6.325 *R3*		6.90 *R3*	8.525 *R3, J3*			5.80 *A5*			
	Detroit, Mich.	4.775 *G3, M2*	5.85 *G3* 5.75 *M2*				7.00 *G2*	8.625 *G3*						
	Newport, Ky.	4.675 *A9*	5.75 *A9*											
	Gary, Ind. Harbor, Indiana	4.675 *U1, I3,Y1*	5.75 *U1, I3,Y1*	6.30 *U1, I3*	6.325 *U1, I3,Y1*	6.70 *U1*	6.90 *U1, Y1,I3*	8.525 *U1, Y1*			5.80 *Y1*	$9.60 *U1, Y1*	$8.30 *I3, U1,Y1*	7.15 *U1, Y1*
	Granite City, Ill.	4.875 *G2*	5.95 *G2*	6.50 *G2*	6.525 *G2*								$8.40 *G2*	7.25 *G2*
	Kokomo, Ind.			6.40 *C9*							5.90 *C9*			
	Mansfield, Ohio		5.75 *E2*			6.70 *E2*								
	Middletown, Ohio		5.75 *A7*	6.30 *A7*	6.325 *A7*	6.70 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.675 *S1, R3,N3*	5.75 *R3*	6.30 *R3*	6.325 *N3*	6.70 *N3*	6.90 *S1, R3*	8.525 *S1, R3*					$8.30 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 *U1, J3,P6*	5.75 *U1, J3,P6*	6.30 *U1, J3*	6.325 *U1*		6.90 *U1, J3,R3*	8.525 *U1, J3*	9.275 *U1*		5.80 *A5, P6,J3*	$9.60 *J3, U1*	$8.30 *U1*	7.15 *U1*
	Portsmouth, Ohio	4.675 *P7*	5.75 *P7*								5.80 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 *W3, W5*	5.75 *W3, W5,F3*	6.30 *W3, W5*		6.70 *W3, W5*	6.90 *W3*	8.525 *W3*				$9.60 *W5*	$8.30 *W5*	7.15 *W5* 7.40 *W3*
	Youngstown, Ohio	4.675 *U1, Y1*	5.75 *Y1*		6.325 *Y1*		6.90 *Y1*	8.525 *Y1*			5.80 *Y1*			7.15 *Y1*
WEST	Fontana, Cal.	5.475 *K1*	6.95 *K1*				7.70 *K1*	9.725 *K1*				$10.35 *K1*	$9.05 *K1*	
	Geneva, Utah	4.775 *C7*												
	Kansas City, Mo.										6.05 *S2*			
	Los Angeles, Torrance, Cal.										6.60 *B2*			
	Minnequa, Colo.										6.05 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.375 *C7*	6.70 *C7*	7.05 *C7*							6.45 *C7*	$10.35 *C7*	$9.05 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.675 *T2, R3*	5.75 *T2,*	6.30 *T2, R3*							5.80 *T2,R3*	$9.70 *T2*	$8.40 *T2*	
	Houston, Tex.										6.05 *S2*			

IRON AGE

STEEL PRICES

(Effective Oct. 30, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem				6.125 *B3*	8.325 *B3*	7.40 *B3*					
	Buffalo, N. Y.	5.075 *B3,R3*	5.075 *B3,R3*	6.90 *B5*	6.125 *B3,R3*	8.325 *B5,B3*	7.40 *B3*	4.85 *B3*				7.20 *W6*
	Claymont, Del.							5.35 *C4*		6.85 *C4*	7.55 *C4*	
	Coatesville, Pa.							5.25 *L4*		6.85 *L4*	7.55 *L4*	
	Conshohocken, Pa.							4.90 *A2*	5.925 *A2*	6.25 *A2*	7.25 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *C3*			
	Hartford, Conn.			7.35 *R3*		8.625 *R3*	7.40 *B3*					
	Johnstown, Pa.	5.075 *B3*	5.075 *B3*		6.125 *B3*			4.85 *B3*		6.85 *B3*	7.25 *B3*	7.20 *B3*
	Fairless, Pa.	5.225 *U1*	5.225 *U1*		6.275 *U1*							
	Newark, N. J.			7.30 *W10*		8.50 *W10*						
	Camden, N. J.			7.30 *P10*		8.50 *P10*						
	Bridgeport, Conn. Putnam, Conn.	5.38 *N8*	5.30 *N8*	7.20 *N8* 7.40 *W10*	6.20 *N8*	8.475 *N8*	7.50 *N8*					
	Sparrows Pt., Md.		5.075 *B3*					4.85 *B3*		6.85 *B3*	6.85 *B3*	7.30 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Pa.	5.225 *M7*	5.225 *M7*	7.40 *B5,C14*		8.325 *A5* 8.625 *B5*						7.50 *A5,W6* 9.025 *T8*
	Spring City, Pa.			7.30 *K4*		8.50 *K4*						
MIDDLE WEST	Alton, Ill.	5.275 *L1*										7.40 *L1*
	Ashland, Newport, Ky.							4.85 *A7,N5*		6.85 *N5*		
	Canton, Massillon, Ohio			6.85 *R3,R2*	6.125 *R3,T5*	8.325 *R3,R2, T5*						
	Chicago, Joliet, Ill.	5.075 *U1,R3, W8,N4* 5.575 *P13*	5.075 *U1,R3, N4* 5.575 *P13*	6.85 *A5,B5, W10,L2 W8,L2,N9*	6.125 *U1,R3, W8*	8.325 *A5,B5, W8,L2,N9, W10*	5.875 *W8*	4.85 *U1,I3, W8,A1*	5.925 *U1*	6.85 *U1,W8*	7.25 *U1*	7.20 *A5,K2, R3,N4,W7*
	Cleveland, Ohio	5.075 *R3*	5.075 *R3*	6.85 *A5,C13*		8.325 *A5,C13*	7.425 *R3*	4.95 *J3,R3*	5.925 *J3*		7.25 *J3,R3*	7.20 *A5, C13*
	Detroit, Mich.	5.175 *G3*	5.425 *G3*	7.05 *B5,P8* 7.10 *P3* 6.85 *R5*	6.225 *G3* 6.125 *R5*	8.525 *B5,P3, P8* 8.325 *R5*	7.525 *G3*	4.95 *G3*		6.90 *G3*		
	Duluth, Minn.											7.20 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.075 *U1,I3, Y1*	5.075 *U1,I3, Y1*	6.85 *R3,M5*	6.125 *U1,I3, Y1*	8.325 *R3,M4*	7.425 *U1,I3, Y1*	4.85 *U1,I3, Y1*	5.925 *I3*	6.85 *U1,Y1*	7.25 *U1,Y1*	7.30 *M4*
	Granite City, Ill.							5.05 *G2*				
	Kokomo, Ind.											7.30 *C9*
	Sterling, Ill.	5.525 *N4*	5.175 *N4*									7.30 *K2*
	Niles, Warren, Ohio Sharon, Pa.			6.85 *C11*	6.125 *C10,S1*	8.325 *C10*	7.425 *S1*	4.85 *S1,R3*		6.85 *S1*	7.25 *S1,R3*	
	Pittsburgh, Pa. Midland, Pa.	5.075 *U1, C11,J3*	5.075 *U1,J3*	6.85 *A5,C8, C11,J3,R3, S9,B4,W10*	6.125 *U1,C11*	8.325 *A5,R3, S9,C8,W10*	7.425 *U1,J3*	4.85 *U1,J3*	5.925 *U1*	6.85 *U1,J3*	7.25 *U1,J3*	7.20 *A5,J3, P6*
	Portsmouth, Ohio											7.20 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							4.85 *W5*				
	Youngstown, Ohio	5.075 *U1, Y1,R3*	5.075 *U1, Y1,R3*	6.85 *U1,Y1, F2*	6.125 *U1,Y1*	8.325 *Y1,F2*	7.425 *U1,Y1*	4.85 *U1,Y1, R3*		6.85 *Y1*	7.25 *Y1*	7.20 *Y1*
WEST	Emeryville, Cal.	5.825 *J5*	5.825 *J5*									
	Fontana, Cal.	5.775 *K1*	5.775 *K1*		7.175 *K1*		8.125 *K1*	5.55 *K1*		7.55 *K1*	7.95 *K1*	
	Geneva, Utah	5.175 *C7*						4.85 *C7*			7.25 *C7*	
	Kansas City, Mo.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*					7.45 *S2*
	Los Angeles, Torrance, Cal.	5.775 *C7,B2*	5.775 *C7,B2*	8.30 *R3*	7.175 *B2*		8.125 *B2*					8.15 *B2*
	Minnequa, Colo.	5.525 *C6*	5.525 *C6*					5.70 *C6*				7.45 *C6*
	Portland, Ore.	5.825 *O2*	5.825 *O2*									
	San Francisco, Niles, Pittsburgh, Cal.	5.775 *C7,P9* 5.825 *B2*	5.775 *C7,P9* 5.825 *B2*				8.175 *B2*					8.15 *C7,C6*
	Seattle, Wash.	5.825 *B2* 5.825 *N6*	5.825 *B2*				8.175 *B2*	5.75 *B2*		7.75 *B2*	8.15 *B2*	
SOUTH	Atlanta, Ga.	5.575 *A8*										7.40 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.075 *T2,R3* 5.375 *C16*	5.075 *T2,R3* 5.375 *C16*				7.425 *T2*	4.85 *T2,R3*			7.25 *T2*	7.20 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*	4.95 *S2* 5.20 *L3*		6.95 *S2*	7.35 *S2*	7.45 *S2*

Steel Prices *(Effective Oct. 30, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston Div., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Dearborn Div., Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	0.00	+15.25	3.00	+11.25	5.50	+7.75	8.00	+7.00	8.50	+6.00	9.00	+5.50	10.50	+5.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Alton, Ill. *L1*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Wheeling *W5*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Indiana Harbor *Y1*	11.50	+5.75	14.50	1.25	17.00	3.75	19.50	4.50	20.00	5.50	20.50	6.00	22.00	5.75	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	4.50	.....	8.50	.....	10.50	.....	11.00	.....	11.50	.....	12.00	.....	12.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Alton, Ill. *L1*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Wheeling *W5*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Indiana Harbor *Y1*	16.00	2.25	20.00	6.25	22.00	9.75	22.50	8.50	23.00	9.50	23.50	10.00	24.00	8.75	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25

Threads only, buttweld and seamless 2½ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 3½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½" and 3" pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.845	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	3	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium	.83 D-3, D-5
Oil hardened manganese	.45 O-2
Special carbon	.41 W-1
Extra carbon	.345 W-1
Regular carbon	.29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b

	Cladding	Plate (*A3, J2, L4*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302				33.25
	304	34.60	38.00	41.50	35.25
	316	39.70	43.20	46.65	52.25
	321	36.35	39.80	43.50	42.00
	347	39.50	43.95	48.45	51.00
	405	29.20	33.15	37.05	
	410, 430	28.70	32.65	36.55	

CR Strip (S9) Copper, 10 pct, 2 sides, 41.40; 1 side, 33.60.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Rolled (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	9.00	9.20	.....
Armature	10.35	10.35	10.85
Elect.	11.00	11.025	11.525
Meter	12.05	12.075	12.575
Dynamo	13.05	13.05	13.55
Trans. 72	14.05	14.05	14.55
Trans. 65	14.60	Grain Oriented	
Trans. 58	15.10	Trans. 80	18.50
Trans. 52	16.15	Trans. 73	19.00

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*) (29¢ higher, HR); Zanesville, Butler (*A7*).

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight charges for seller's account.

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.00
Mesabi, nonbessemer	10.85
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Warren Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Am'd Col ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	167	181	...	195	187	8.10	8.50
Aliquippa, Pa. *J3***	164	179	...	...	181	7.95	8.475
Atlanta *A8***	166	182	...	192	190	8.05	8.65
Bartonville *K2***	166	182	...	192	190	8.05	8.65
Buffalo *W6*	...	...	...	...	...	8.10	8.50
Chicago, Ill. *N4***	164	180	167	190	188	7.95	8.55
Cleveland *A6*	173	...	...	...	...	8.10	.....
Cleveland *A5*	...	...	...	...	...	7.95	.....
Crawfordsville *M4***	166	182	...	192	190	8.05	8.65
Donora, Pa. *A5*	164	176	...	190	184	7.95	8.35
Duluth *A5*	164	176	...	190	184	7.95	8.35
Fairfield, Ala. *T2*	164	176	...	190	184	7.95	8.35
Galveston *D4*	180‡	...	...	...	...	...	.....
Houston *S2*	169	181	...	195	189	8.20	8.60
Johnstown, Pa. *B3***	164	180	167	...	188	7.95	8.55
Joliet, Ill. *A5*	164	176	...	190	184	7.95	8.35
Kokomo, Ind. *C9**	166	178	...	192	186	8.05	8.45
Los Angeles *B2***	...	...	...	...	...	8.90	9.50
Kansas City *S2**	169	181	...	195	189	8.20	8.60
Minnequa *C6*†	169	181	...	195	189	8.20	8.60
Monessen *P6*	167	185	...	...	191	8.10	8.10
Pittsburg, Cal. *C7*	186	199	...	...	204	8.90	9.30
Portsmouth *P7*	...	...	...	...	...	8.10	.....
Rankin, Pa. *A5*	164	176	...	...	184	7.95	8.35
So. Chicago *R3*	167	181	...	195	187	8.10	8.50
S. San Francisco *C6*	...	...	...	219	...	9.05	9.45
Sparrows Pt. *B3***	166	...	...	192	190	8.05	8.65
Struthers, O. *Y1**	...	...	...	...	...	7.95	8.45
Worcester *A5*	170	...	...	...	...	8.25	8.65
Williamsport, Pa. *S5*	...	...	175	...	...	...	.....

* Zinc less than .10¢. † Plus zinc extras.
** 13.5 zinc. ‡ Wholesalers only.
*** .10¢ zinc.

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery ‡ Charge	Sheets: Hot-Rolled 18 ga. & hvr.	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.07	9.27	9.83	8.16	.....	8.40	8.44	8.30	10.14	.....	.....	.....	.....
Baltimore	$.10	7.79	9.54	9.12	8.27	.....	8.12	8.57	8.34	9.99	14.99	14.44	18.39	18.00
Birmingham	.15	7.68	8.88	8.85	7.78	.....	8.01	8.05	7.91	10.04	.....	.....	.....	.....
Boston	.10	8.70–8.80	9.73–9.83	11.12	8.79–8.89	.....	8.98–9.08	8.90–9.00	8.88–8.98	10.71–10.81	15.05	14.45	18.51	18.10
Buffalo	.15	7.90	9.05	10.87	8.15	.....	8.40	8.40	8.15	8.85	15.00	14.45	18.40	.....
Chicago	.15	7.70–7.85	8.88–9.05	9.85	7.78–7.93	.....	8.01–8.16	8.05–8.20	7.91–8.06	8.35–8.50	14.65	14.10	18.05	17.75
Cincinnati	.15	7.97	9.04	9.90	8.21	.....	8.49	8.70	8.34	8.97	14.93	14.38	18.33	18.03
Cleveland	.15	7.83	9.03	9.75	8.03	.....	8.36	8.53	8.14	8.75	14.73	14.18	18.13	17.83
Denver		9.55	11.09	12.41	9.70	.....	9.80	9.60	9.75	10.54	.....	.....	.....	19.79
Detroit	.15	8.06	9.28	10.17	8.25	.....	8.48	8.70	8.33	8.83	.....	14.04	.....	17.09
Houston		8.70	9.65	.....	8.80	.....	8.60	8.90	8.95	10.55	15.50	.....	19.30	19.05
Kansas City	.20	8.52	9.72	10.07	8.60	.....	8.83	8.87	8.73	9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	9.00	10.75	11.75	9.20	.....	9.45	9.05	8.90	11.80	15.85	15.35	19.70	19.45
Memphis	.15	8.02	9.22	.....	8.12	.....	8.35	8.39	8.25	9.85	.....	.....	.....	.....
Milwaukee	.15	7.97	9.17	9.97	8.05	.....	9.53	8.39	8.18	8.72	14.77	.....	18.17	17.87
New York	.10	8.45	9.63	10.33	8.91	.....	8.88	8.84	8.93	10.71	15.02	14.47	18.42	18.12
Norfolk	.20	8.00	.....	.....	8.40	.....	8.35	8.70	8.45	10.70	.....	.....	.....	.....
Philadelphia	.10	7.89–7.99	9.08–9.18	9.66–10.22	8.58–8.68	.....	8.28–8.38	8.38–8.48	8.37–8.47	9.12–9.22	14.80	14.15–14.25	18.20	17.90
Pittsburgh	.15	7.83	9.03	10.20	8.03**	.....	8.16	8.20	8.06	8.75	14.65	13.80–14.10	18.05	16.85–17.75
Portland		8.90	9.65	11.40	9.05	.....	8.70	8.90	8.95	13.55	16.70	16.10	20.40	20.25
San Francisco	.10	8.85	10.40	10.90	9.05	.....	8.95	8.95	8.90	12.40	15.85	15.35	19.70	19.45
Seattle		9.35	11.20	11.55	9.50	.....	9.05	9.15	9.30	13.15	16.10	15.55	19.50	19.20
St. Louis	.15	8.02–8.17	9.16–9.36†	10.03–10.18	8.11–8.26	.....	8.34–8.49	8.48–8.63	8.25–8.40	8.93–9.08	14.83–14.98	14.28	18.23–18.38	17.93
St. Paul	.15	8.44	9.64	10.46	8.54	.....	8.86	8.90	8.67	9.36	.....	14.62	.....	18.27

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
** F.O.B. Plant, warehouse price. † 16 gage. ‡ Deduct for country delivery.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Baltimore, Md. *T8*	8.25	10.10	12.90	15.30	18.25
Bristol, Conn. *W12*	...	...	12.90	15.30	18.25
Boston *T8*	8.50	10.10	12.90	15.30	18.25
Buffalo, N. Y. *R7*	7.95	9.80	12.60	15.00	17.95
Carnegie, Pa. *S9*	‡	9.80	12.60	15.00	.....
Cleveland *A5*	7.95	9.80	12.60	15.00	17.95
Detroit *D1*	8.05	9.90	12.70	15.10	.....
Detroit *D2*	8.05	9.90	12.70	.....	.....
Dover, O. *G4*	7.95	9.80	12.60	15.00	17.95
Franklin Park, Ill. *T8*	8.05	9.80	12.60	15.00	17.95
Harrison, N. J. *C11*	...	...	12.90	15.30	18.25
Indianapolis *C5*	8.10	9.95	12.60	15.00	17.95
New Castle, Pa. *B4*	7.95	9.80	12.60	15.00	.....
New Haven, Conn. *D1*	8.40	10.10	12.90	15.30	.....
Pawtucket, R. I. *N7*	8.50	10.10	12.90	15.30	18.25
Pittsburgh *S7*	7.95	9.80	12.60	15.00	17.95
Riverdale, Ill. *A1*	8.05	9.80	12.60	15.00	17.95
Sharon, Pa. *S1*	7.95	9.80	12.60	15.00	17.95
Trenton *R4*	.....	10.10	12.90	15.30	18.25
Wallingford *W1*	8.40	10.10	12.90	15.30	18.15
Warren, Ohio *T4*	7.95	9.80	12.60	15.00	17.95
Weirton, W. Va. *W3*	7.95	9.80	12.60	15.00	17.95
Worcester, Mass. *A5*	8.50	10.10	12.90	15.30	18.25
Youngstown *C5*	7.95	9.80	12.60	15.00	17.95

‡ On Application.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	44.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	11	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
National Tube	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	33.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	11	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
Pittsburgh Steel	2	13	34.88	40.85	.....	.....
	2½	12	46.98	55.01	.....	.....
	3	12	54.24	63.53	.....	.....
	3½	11	63.32	74.16	.....	.....
	4	10	84.09	98.47	.....	.....

(Effective Oct. 30, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.075	6.00	6.35	....	....	....	....
So. Chicago *R3*	....	....	....	8.775	....	....	....
Ensley *T2*	5.075	6.00	....	....	....	....	....
Fairfield *T2*	....	6.00	....	8.775	....	6.025	....
Gary *U1*	5.075	6.00	....	....	....	6.025	....
Ind. Harbor *I3*	5.075	....	6.35	8.775	....	6.025	....
Ind. Harbor *Y1*	....	....	....	8.775	....	....	....
Johnstown *B3*	....	6.00	....	....	....	....	....
Joliet *U1*	5.075	....	6.35	....	....	....	....
Kansas City *S2*	....	....	....	8.775	....	....	....
Lackawanna *B3*	5.075	6.00	6.35	....	....	6.025	....
Lebanon *B3*	....	....	....	....	....	....	13.10
Minnequa *C6*	5.075	6.50	6.35	8.775	....	6.025	13.10
Pittsburgh *P5*	....	....	....	8.775	12.85	....	....
Pittsburgh *J3*	....	....	....	8.775	....	....	13.10
Seattle *B2*	....	....	....	9.275	....	6.175	13.16
Steelton *B3*	5.075	....	6.35	....	....	6.025	13.10
Struthers *Y1*	....	....	....	8.775	....	....	....
Torrance *C7*	....	....	....	....	....	....	....
Williamsport *S5*	....	6.15	....	....	....	....	....
Youngstown *R3*	....	....	....	8.775	....	....	....

COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. ..... $14.50 to $14.75
Foundry, beehive (f.o.b. oven)
$17.00 to $18.00
Foundry, oven coke
Buffalo, del'd $30.75
Detroit, f.o.b. 29.50
New England, del'd 30.55
Seaboard, N. J., f.o.b. 28.75
Philadelphia, f.o.b. 28.50
Swedesland, Pa., f.o.b. 28.50
Painesville, Ohio, f.o.b. 29.50
Erie, Pa., f.o.b. 29.50
Cleveland, del'd 31.55
Cincinnati, del'd 28.59
St. Paul, f.o.b. 28.50
St. Louis, f.o.b. 30.50
Birmingham, f.o.b. 27.60
Milwaukee, f.o.b. 29.50
Lone Star, f.o.b. 25.50

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100, 110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper
Cast elliptical, 18 in. or longer, 5000 lb lots 62.92
Electrodeposited 50.28
Brass, 80-20, ball anodes, 2000 lb or more 60.00
Zinc, ball anodes, 2000 lb lots 21.25
(for elliptical add 2¢ per lb)
Nickel, 99 pct plus, rolled carbon... 90.50
(rolled depolarized add 3¢ per lb)
Cadmium $1.70
Tin, ball anodes and elliptical. $1.06 to $1.10

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum 80.50
Copper sulphate, 5 or more 100 lb bags, per cwt. 27.15
Nickel salts, single, 4-100 lb bags.. 38.25
Nickel chloride, freight allowed, 300 lb 46.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums 22.35
(Philadelphia price 22.60)
Zinc cyanide, 100 to 900 lb..... 55.55
Potassium cyanide, 100 lb drum N. Y. 48.00
Chromic acid, flake type, 1 to 20 100 lb drums 29.25

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)
Pct Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	55	58½	60½	61½
⅝" thru 1" x longer than 6"	46½	50	52½	54
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	55	58½	60½	61½
Lag, all diam. x 6" & shorter	55	58	60	61
Lag, all diam. longer than 6 in.	47	50	52	53
Plow bolts, ½" and smaller x 6" and shorter	54	57½	59	60

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full Case or Keg Price
¾ in. or smaller	63
⅞ in. to 1 in. inclusive	59½
1⅛ in. to 1½ in. inclusive	64
1⅝ in. and larger	58
C.P. Hex regular & hvy.	
¾ in. and smaller	63
⅞ in. to 1½ in. inclusive	59½
1⅝ in. and larger	58
Hot Galv. Nuts (All Types)	
¾" and smaller	50
Semi-finished Hex Nuts	
¾ in. and smaller	63
⅞ in. to 1½ in. inclusive	59½
1⅛ in. and larger	58
(Add 25 pct for broken case or keg quantities)	
Finished	
1" and smaller	65

Rivets

Base per 100 lb
½ in. and larger $10.85
Pct Off List
7/16 in. and smaller 26½

Cap Screws

	Discount (Packages) *Bright Treated*	*H. C. Heat*
New std. hex head, packaged		
⅝" diam. and smaller x 6" and shorter	47	34
¾", ⅞" and 1" diam. x 6" and shorter	31	13
⅝" diam. and smaller x longer than 6"	18½	+ 1
¾", ⅞" and 1" diam. & longer than 6"	5½	+19½

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	47	63
¾" through 1" dia. x 6" and shorter	31	51½

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Quantity	Discount Mach. Screws	Stove Bolts
Cartons		19	32
Bulk			
To ¼" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	15,000-100,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

	Quantity	Discount Hex	Square
In cartons		16	19
In Bulk			
⅜" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham 119.0
New York 131.4
Chicago 133.4
San Francisco-L. A. 140.2
Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick *Carloads per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00) $128.00
No. 1 Ohio 128.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 114.00
No. 2 Ohio 98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00) 20.00

Silica Brick

Mt. Union, Pa., Ensley, Ala. $140.00
Childs, Hays, Pa. 145.00
Chicago District 150.00
Western Utah 144.00-165.00
California 170.00
Super Duty
Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville 150.00-157.00
Silica cement, net ton, bulk, Latrobe 26.50
Silica cement, net ton, bulk, Chicago 24.00
Silica cement, net tons, bulk, Ensley, Ala. 25.50
Silica cement, net ton, bulk, Mt. Union 23.00
Silica cement, net ton, bulk, Utah and Calif. 35.00

Chrome Brick *Per net ton*

Standard chemically bonded, Balt.. $98.00
Standards chemically bonded, Curtiner, Calif. 108.00
Burned, Balt. 92.00

Magnesite Brick

Standard, Baltimore $121.00
Chemically bonded, Baltimore 109.00

Grain Magnesite St. ⅝ to ⅛-in. grains

Domestic, f.o.b. Baltimore in bulk. $69.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
in bulk 43.00
in sacks 49.00

Dead Burned Dolomite *Per net ton*

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $16.00
Midwest 16.35
Missouri Valley 15.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron f.o.b. Riverton, N. J., ocean bags 8.50¢
Canadian sponge iron, Del'd in East, carloads.... 9.5¢
Domestic sponge iron, 98+% Fe, carload lots ..... 8.5¢
Electrolytic iron, annealed, imported 99.5+% Fe .... 27.5¢
domestic 99.5+% Fe .... 36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe 57.0¢
Electrolytic iron melting stock, 99.84% pure ..... 22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe..86.0¢ to $1.55
Aluminum freight allowed.. 38.00¢
Brass, 10 ton lots .....37.50¢ to 50.00¢
Copper, electrolytic ..... 59.50¢
Copper, reduced ..... 59.50¢
Cadmium, 100-199 lb, 95¢ plus metal value
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd.... $5.00
Lead .....8.90¢ plus metal value
Manganese ..... 70.0¢
Molybdenum, 99% .....$3.35 to $3.85
Nickel, unannealed $1.00
Nickel, annealed $1.06
Nickel, spherical, unannealed #80 ..... $1.13
Silicon ..... 43.50¢
Solder powder...7.0¢ to 9.0¢ plus met. value
Stainless steel, 302 ..... 99.0¢
Stainless steel, 316 ..... $1.32
Tin .....14.00¢ plus metal value
Tungsten, 99% (65 mesh).. $4.50
Zinc, 10 ton lots .....18.75¢ to 32.50¢

Ferroalloy Prices

(Effective Oct. 30, 1956)

(Other ferroalloy prices normally appearing on this page will next be seen in the Nov. 8 issue.)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C ...	41.50	0.20% C ...	38.50
0.03% C ...	41.00	0.50% C ...	38.25
0.06% C ...	39.50	1.00% C ...	37.50
0.10% C ...	39.00	1.50% C ...	37.35
0.15% C ...	38.75	2.00% C ...	37.25

4.00-4.50% C, 67.70% Cr, 1-2% Si.. 27.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.75
0.025% C (Simplex) 34.75
0.10% C, 50-52% Cr, 2% max Si.... 35.75
8.50% max. C, 50-55% Cr, 3-6% Si. 24.00
8.50% C, 50-55% Cr, 3% max Si.... 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 33-91% Cr, 0.75% Fe..	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 3" x D plate (¼" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh.

Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 33-42% Cr, 17-19½ Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11% Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 24.15

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.: Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.75
Johnstown, Pa.	11.75
Sheridan, Pa.	11.75
Philo, Ohio	11.75
S. Duquesne	11.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.90
Ton lots packed	16.30

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$97.50
19 to 21%	3% max.	99.50
21 to 23%	3% max.	102.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	33.00
Ton lots	35.00
250 to 1999 lb	37.00
Premium for hydrogen-removed metal	0.75

"DAVIS" KEYSEATER
Low in Cost. Durable. Easy to operate.
Table adjustable for straight or taper keyways.
Three sizes. Keyways 1/16" up to 1".
DAVIS KEYSEATER CO.
400 Exchange St., Rochester 8, N. Y.

TITANIUM BAR 72012 Lbs.

TI 140 A Round	9"	4920 lbs.
TI 140 A Round	8"	14138 lbs.
TI 140 A Round	7"	47536 lbs.
TI 155 AX RCS	7½"	1912 lbs.
RC 130 B RCS	9"	824 lbs.
RC 130 B Flat Stock	1⅝" x 10"	1611 lbs.
RC 130 B Flat Stock	1 9/16" x 10"	267 lbs.
RC 130 B Rounds	6½", 7", 7½"	804 lbs.

$3.75 PER LB.
FOR 1000 LBS. OR MORE
MILT GROBAN
9656 S. MERRION AVE., CHICAGO 17, ILL.
SAginaw 1-3442

ZINC WIRE—STRIP, COILED FOR ELECTRIC FUSE ELEMENTS
EYELETS ALSO BRASS OR STEEL
THE PLATT BROS. & CO., WATERBURY, CONN.

Cutting Off Machines for Sawing All Kinds of Metals
THE ESPEN-LUCAS MACHINE WORKS
FRONT AND GIRARD AVE., PHILADELPHIA, PENNA.

BROWNING ELECTRIC TRAVELING CRANES AND HOISTS up to 125-TON CAPACITY
VICTOR R. BROWNING & CO., INC. WILLOUGHBY (Cleveland), OHIO

GOSS and DE LEEUW
MULTIPLE SPINDLE
CHUCKING MACHINES
Four, Five, Six, Eight Spindles • Work and Tool Rotating Type
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

HOT DIP GALVANIZING
JOSEPH P. CATTIE & BROTHERS, INC.
2520 East Hagert St.
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30 Cupola Type, Steel Underframe
CABOOSE CARS
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RAILWAY TANK CARS and STORAGE TANKS
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"ANYTHING containing IRON or STEEL"

THE CLEARING HOUSE

News of Used and Rebuilt Machinery

A Brisk Fall . . . The rapid pace which the used machinery business set in the Detroit area last month is continuing through October. Demand for just about all types of good used machinery is strong.

Many reasons are given for the pickup in business. The steel labor picture has stabilized; vacation season for small shops, which are the best customers, has ended. And new model production is finally starting to get off the ground.

Wanted: Production Tools . . . The emphasis right now is for production tools. This is particularly true of large presses and press brakes. Although inventories of these items are considered adequate, there are cases where a dealer has difficulty in filling a specific order.

This is true in other places besides Detroit. There are an increasing number of inquiries coming from other parts of the country for good, large presses and in a lot of cases there are no sales because dealers don't have the specific item on hand.

Rebuilding's Factor . . . Tool room equipment, always a good seller here, is beginning to ease somewhat. Dealers lay this mostly to completion of programs for 1957 cars. They look for another big spurt when the 1958 programs start to gather steam.

Rebuilding also continues at a good rate. One dealer reports a shortage of replacement parts as one of his biggest problems. He cites cases where rebuilding jobs have been held up as long as 3 to 4 months for lack of parts. Some dealers are even buying older machines just to salvage some of the parts from them.

Stocks Adequate . . . Inventories, although spotty, are considered adequate. There is a lesser supply of tool room equipment at this point but this is mainly because of the demand during work on the new model cars. It isn't expected to last long.

S-P Sells . . . Studebaker-Packard has started to sell the machinery in its old Packard plant here. Attendance at the sales has been good but few dealers are doing any bidding. They still complain about the high prices compared to what they can get for a rebuilt, guaranteed machine.

In addition to inquiries coming from other parts of the country, one dealer is busy preparing machinery to ship to India and the Argentine.

Across the Line . . . Another company reports that the bulk of its recent business has been outside Detroit in the neighboring states of Ohio, Indiana, Illinois and Kentucky. Another is selling machinery as far away as Alabama.

In general, dealers expect the present trend to continue well into 1957. The increase in the price of new machine tools is one of the factors which dealers expect will make used machinery look more attractive to prospective customers.

On the West Coast . . . Lathes still head the San Francisco Bay area best seller list. However milling machines, automatic screw machines, surface grinders and other standard equipment and production tools gather no dust in warehouses.

One dealer states the mid-year letdown was not anywhere near as sharp as had been expected. Another dealer admitted business was "about 5 pct ahead of last year and should wind up with the same gain." Still another talked of a "10 to 20 pct gain."

CONSIDER GOOD USED EQUIPMENT FIRST

BENDER & STRAIGHTENER
#4 H & J. Capacity 15" I-beams, 9" Girder Rail, 100 lb. Tee Rails, Motor Drive

BENDING ROLLS
6' x 3/16" Niagara Initial Type
8' x ⅜" Webb 129-V Vertical
12' x ⅝" Southwark Pyramid Type
16' x ⅝" Niles Pyramid Type
20' x 1" Hilles & Jones Pyramid Type

BRAKES—LEAF TYPE
12' x ¼" Dreis & Krump
12' x ½" Dreis & Krump Motor Driven

BRAKES—PRESS TYPE
10' x ¼" Superior Hydraulic, NEW
12' x ½" Superior Hydraulic, NEW

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	29' Span	230 Volt D.C.
5 ton Whiting	48' Span	220/3/60 A.C.
5 ton Shaw	54' Span	230 Volt D.C.
10 ton Cyclops	40' Span	220/440 A.C.
15 ton P&H	46' Span	230 Volt D.C.
25 ton L-B	75' Span	220/3/60 A.C.
Incl. 300 ft. Runway		
80 ton Niles	72' Span	230 Volt D.C.
120 ton Niles	68' Span	440/3/60 A.C.

FORGING MACHINES
1 to 5" Acme, Ajax, National

HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING—800 lb. to 20,000 lb.

LEVELLERS—ROLLER
44" Newbold, Nine Rolls 4" Dia.
54" Aetna Standard, 17 Rolls 3¾" Dia.
72" McKay, 17 Rolls 4¼" Dia.

PRESSES—HYDRAULIC
250 ton Bliss Double Acting 42" Stroke 48x49" Bed
500 ton Elmes 18" Stroke Lower Platen 38" x 66"
750 ton Baldwin Triple Acting Bolster 84" x 132"
1200 ton United Steam Hydraulic Forging Press
4500 Baldwin-Lima-Hamilton Hydr. Forging Press

PRESS—INCLINED
125 ton Beatty Open Back, 1½" Stroke, Area of Bed 28¾ x 26½"

PRESSES—STRAIGHT SIDE
Clearing Model TF41500-200 Triple Acting Strokes 40, 32, 14". Bed Area 109" x 200"
100 ton Clearing, 14" Stroke, 36" x 36" Bed
250 ton Bliss, 16" Stroke, 22" x 29" Bed
250 ton Toledo, 6" Stroke, 36" x 72" Bed

PUNCH—BEAM
#7 Kling Universal Punch, Capacity Punch 1¼ x 1" 118 Ton. Punches in flange & web of H-Beams, I-Beams & Channels

PUNCH & SHEAR COMBINATIONS
#44 x 48 Buffalo RAP, Capacity ½" x ⅝"
Cleveland Style G Single End, 60" Throat
No. 1½ Buffalo Universal Ironworker

ROLLS—PLATE STRAIGHTENING
72" Bertsch Seven Rolls 7" Dia.
86" H & J. Six Rolls 10" Dia.
12' Newbold, Nine Rolls 14" Dia.

ROLLING MILLS
10" x 16" Single Stand, Two High
12" x 14" Twelve Stand, Two High Strip Mill
12" x 16" Phila. Single Stand, Two High
15" x 30" G & M Single Stand, Two High
16" x 24" Farrel Two Stand, Two High
20" x 60" Two High Breakdown Mill
26" x 54" United Single Stand, Two High
26" x 72" Cold Rolling Mill
44" x 28" Three High
22" x 13" x 40" Lewis 3-High Shut Mill

SHEAR—GATE
80" x ⅜" Pels Model S T A U—22, All Steel

SHEARS—ROTARY
#23A Quickwork Whiting, 3/16" Capy.
#250 Kling, ¼" Capy.

SHEARS—SQUARING
8' x ¼" Niagara, LATE
10' x ¼" Cincinnati, LATE
16' x ¼" Toledo

SLITTERS
12" Blake & Johnson
21" Custom Built Slitting Line, Model W-125 Torrington Segment Type. Dia. .080 to .027". Length 0 to 144".

SPRING COILING MACHINE
Model W-20 Torrington. Wire Dia. .008" to .028" Wire Length per spring .57" to .665"

SWAGING MACHINE
#6¼A Fenn, Capacity 2½" Tube, 3¾" Solid 10" Die Length, Hydraulic Feed, LATE

TESTING MACHINES
60,000, 100,000, 200,000 Olsen & Riehle Universal 50,000 and 300,000 lb Compression

TUBE MILL
Elms IK Welded Tube Mill, Cut-off & Transformer Capy. ½" OD 0.28 wall to 2" OD .120 wall

WELDING POSITIONER
14,000# Cullen Friestedt Model #140, 220/440

WIRE DRAWING MACHINE
BBS-13 Syncro Fine Wire Drawing Machine

● Manufacturing

A. T. HENRY & COMPANY, INC.

● Equipment

50 CHURCH ST., NEW YORK CITY 8
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ELECTRIC POWER EQUIPMENT
A. C. MOTORS

3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
2	1750	G.E.	M-579BS	4800	1800
1	1100	F.M.	OVZK, B.B.	4800	1800
1	1000	A.C.	Mill	2300	240
1	800	G.E.	MT	2300	393
1	750	G.E.	MT-573	2200	1190
1	700	A.C.		2300	500
1	500	Whse.	CW	550	350
1	400	Whse.	CW-950A	440	1170
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1213	2200	435
1	350	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	MT-539S	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	20QB	440	505
1	200	G.E.	IM	440	435
1	200	G.E.	IM	2200	580
1	150 (unused)	Whse.	CW	2300	435
2	125	A.C.		440	865
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1	100	G.E.	IM	440	600
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2	450	Whse.	CR-1420	2300/4150	354
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3	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440	900/450
1	150	Whse.	C8S568	440	880
1	150	Whse.	CR	440	580
2	125	Al. Ch.	ARW	2200	1750

SYNCHRONOUS

Qu.	H.P.	Make	Type	Volts	RPM
1	7000	G.E.	ATI	2200/6600	600
1	4350	C.W.	3501SL4000/6900/13800		514
1	2850	Whse.	.8 p.f.	2300/4600	514
1	2500	Whse.	.8 p.f.	2300	720
2	2000	Whse.		2300	120
2	1750	G.E.	ATI	2300	3600
1	725	G.E.	ATI	2200/12000	600
1	500	G.E.	TS-7567	2200	1200
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1	450	Whse.		2200	450
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1	1000	720	Whse.	600	2300/4160
1	500	1200	Whse.	125/250	2300/440
1	500	720	Cr.Wh.	575/600	2300
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1	300	1200	G.E.	250	2300
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1	200	1200	Elliott	125	4000/2300
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1	175	1200	G.E.	250	440/220
2	150	1200	Whse. SK	250	2300/440
3	150	1200	Reliance	125	2300/440
1	150	1200	G.E.	250	2300
1	100	1200	Whse. SK	125/250	440/220
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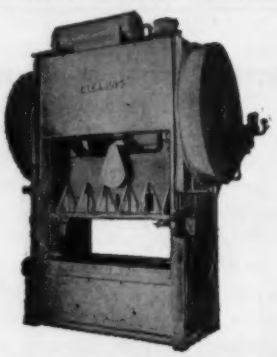

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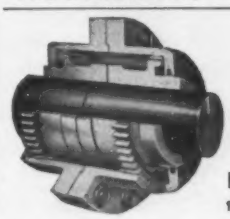

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Crucible Buys Up Vacuum Metals Corp.

National Research Corp. announced sale of its entire interest in Vacuum Metals Corp. to Crucible Steel Co. of America. Vacuum Metal's facilities at Syracuse, N. Y., had been operated as a jointly owned subsidiary of Crucible and National. Richard S. Morse, president of National, said his company plans to concentrate on "research in new metals and alloys and development of improved large scale vacuum melting equipment."

Plymouth Narrows Price Differential

Plymouth Div. announced price adjustments in its lowest priced 1957 Plaza series that would narrow Ford and Chevrolet's price advantage to $19 and $18 respectively. In 1956, Chevrolet price was $51 lower than Plymouth in its lowest-priced line. Meanwhile, General Motors announced a $100 increase on one Pontiac model and a $644 boost for the Cadillac 75 Imperial. American Motors hiked prices 5.35 pct for its Rambler series, but cut Nash and Hudson prices by $236 to $378.

Long Range Buying Falls Off

More companies shortened their forward-buying commitments during October, the National Association of Purchasing Agents reports. Fewer firms are buying production items 120 days or further ahead, while there is a corresponding increase in the number buying only 30 days ahead. Forward buying at today's high prices appeared to be too risky a gamble, the association said.

Pig Iron Output Higher In Canada

Canadian pig iron production in August totaled 316,726 net tons, a daily average of 97.6 pct of rated capacity. It compares to 307,642 tons or 94.8 pct in July, and to 288,864 tons or 89 pct in August, 1955. For the eight months ending with August, Canadian pig iron output totaled 2,352,052 net tons compared to 2,077,239 tons in the corresponding period of 1955.

Three Appliance Plants To Close

Rising production costs, over capacity, and price cutting in the appliance and television industry are responsible for the announced closing of one plant Nov. 2, and two more on Nov. 30. Sylvania Electric Products, Inc., said it will discontinue manufacturing operations at its Hatboro, Pa., picture tube plant on the former date. About 450 employees will be affected. Avco Manufacturing Corp. revealed that its Crosley and Bendix divisions will discontinue their operations on the latter date. Avco said that negotiations are under way with a major appliance manufacturer for sale of the Bendix Div. home laundry business.

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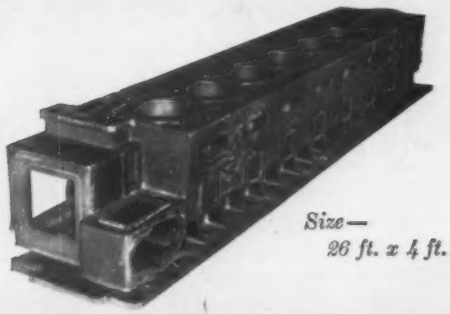

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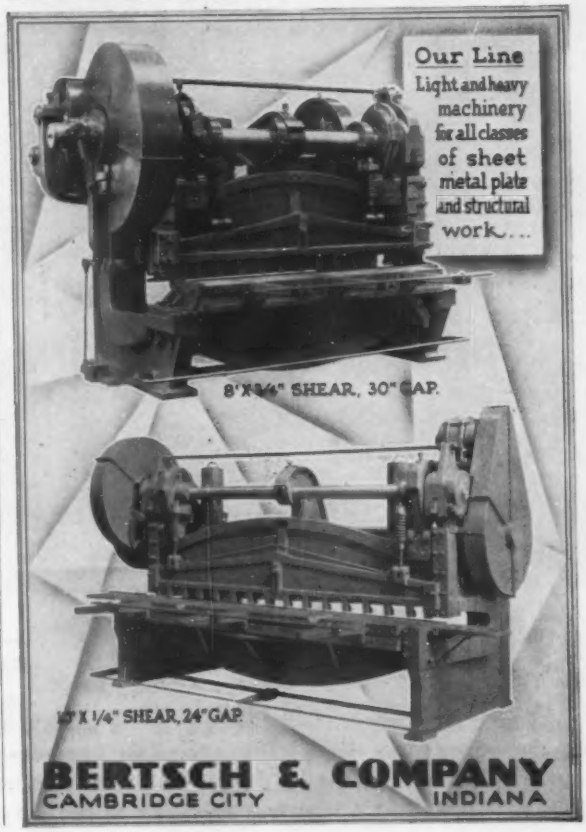
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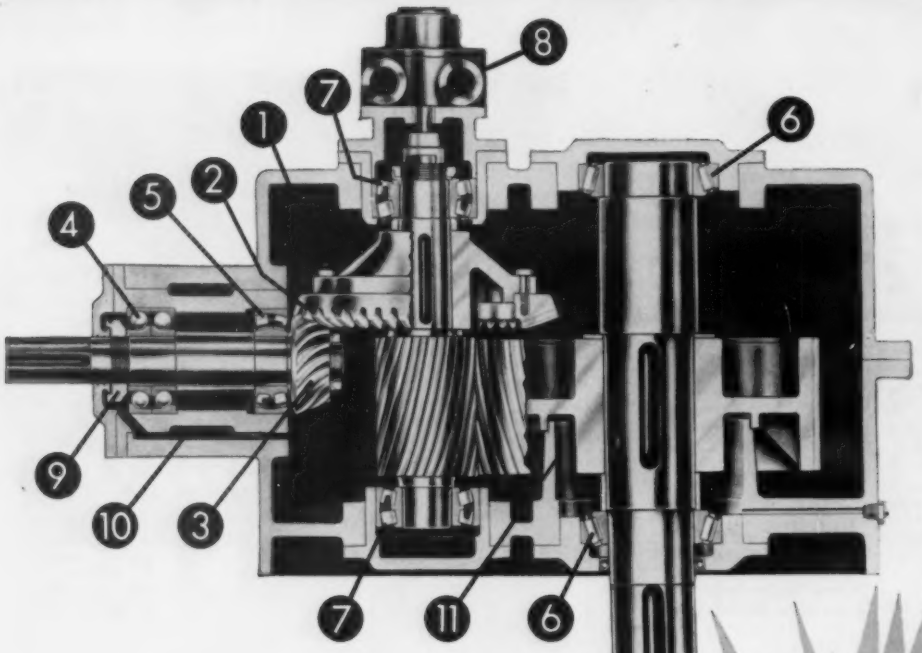

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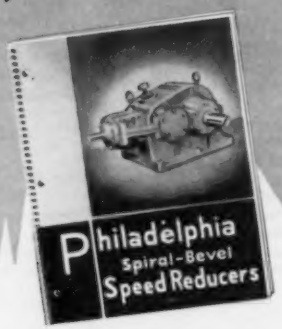

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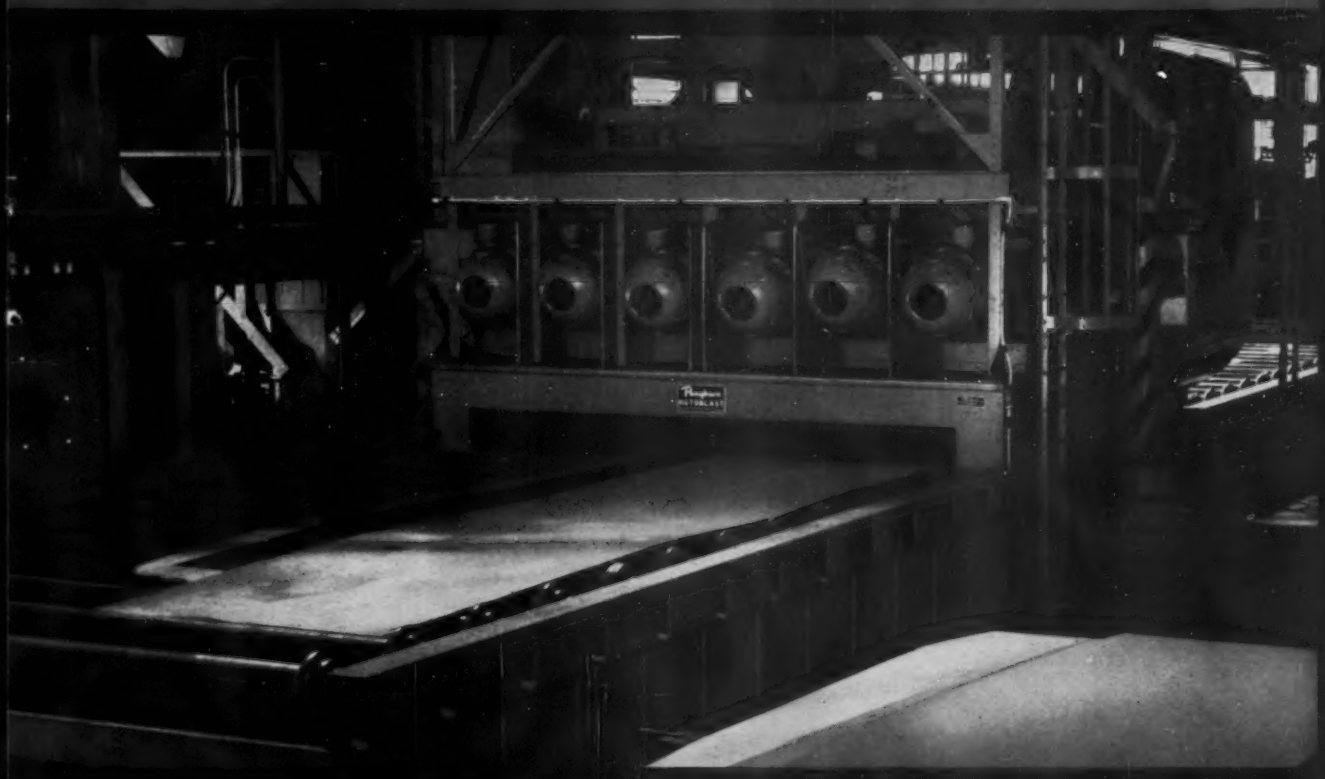
Descale steel sheets, plates, coils



at less than half the cost

No more scale breaking or pickling! No more acid disposal problems! Pangborn Rotoblast Descaling Machines descale steel sheets, plates and coils, and they operate at big savings over pickling costs!

How? They work quickly. They clean thoroughly. They're a one-man operation. Unlike acid baths, they can be located near your production, cutting handling costs. And they save floor space, require much less room than vats. Available in a variety of models, Pangborn Rotoblast Descaling Machines handle steel sheets, plates and coils of any thickness, width and length. If you want to cut descaling costs to the bone, investigate Pangborn Descaling Machines!

For complete information, send for Bulletin 224. Write: PANGBORN CORPORATION, 1500 Pangborn Blvd., Hagerstown, Maryland.

*U. S. Pat. #2184926 (other patents pending)

with Pangborn Rotoblast* Descaling Machines!

Pangborn

BLAST CLEANS CHEAPER

Rotoblast Blastmaster® & Continuous-Flo Barrel

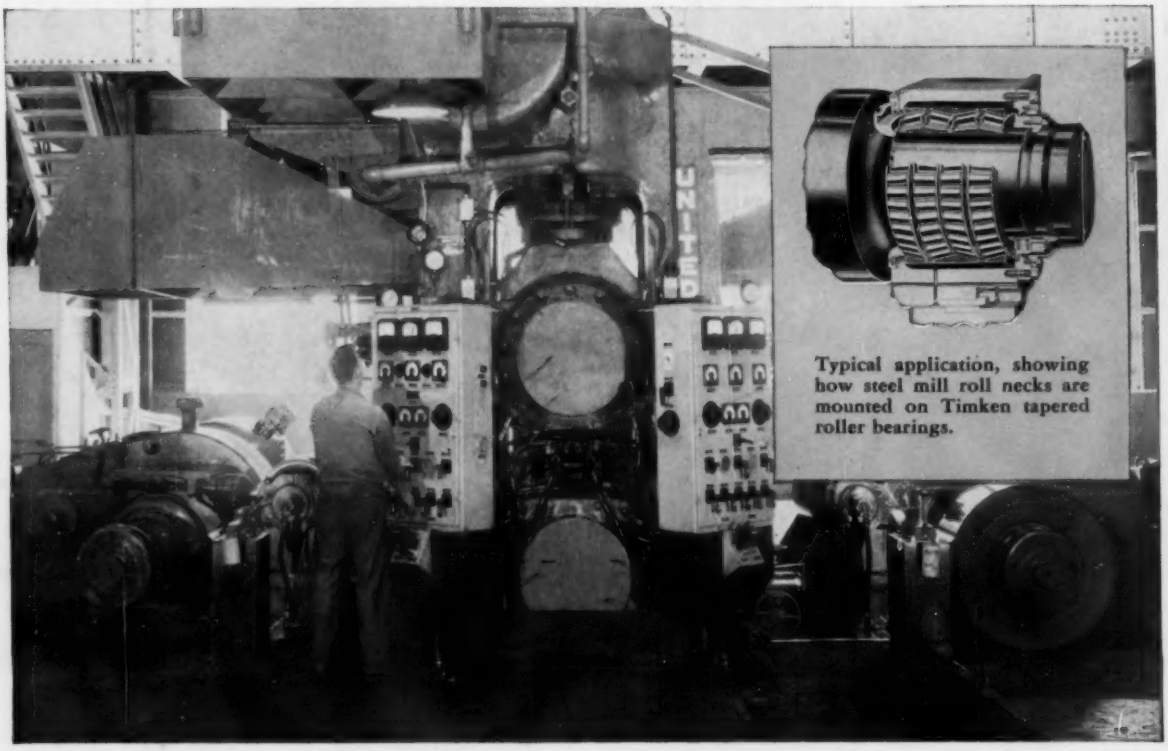
Rotoblast Tables & Table-Rooms

Special Blast Rooms & Cabinets

Pangborn Dust Control Equipment

Distributors for Malleabrasive and Tru-Steel Abrasives

Scrap loss minimized with reversing cold mill back-up rolls on TIMKEN® bearings



Typical application, showing how steel mill roll necks are mounted on Timken tapered roller bearings.

THE back-up rolls on this United Engineering 6″ & 34″ x 30″ 4-high reversing cold mill at Allegheny Ludlum's Leechburg plant are mounted on Timken® tapered roller bearings. Timken bearings give low torsional resistance, regardless of operating speed or load. This eliminates the need for altering or relieving screw-down pressure — maintains gauge which minimizes scrap loss at each end of the coil. Less hydraulic accumulator pressure is needed with rolls driving easier on Timken bearings, which reduces bearing wear, cuts maintenance cost.

The balanced proportion design of Timken bearings provides maximum capacity in a given space. Timken tapered roller bearings give you greater mill rigidity, permit large diameter roll necks. They take both radial and thrust loads in any combination, require *no extra thrust devices*—which means more compact chuck mountings, simplified mill design. And by holding mill rolls rigid, Timken bearings help insure "on-gauge" operation, cutting scrap loss and reducing still further the cost per ton of steel rolled.

With Timken bearings, roll and chuck are held concentric, making closures more effective. There's less leakage of lubricant. And with economically grease-lubricated Timken bearings, lubrication requires no tubes, pipes or reservoirs. When you build or buy machinery, look for the trademark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

TIMKEN *TAPERED ROLLER BEARINGS ROLL THE LOAD*

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